

Important Disclosures

Current performance may be lower or higher than return data quoted herein. For more current information, including month-end performance, please visit <https://retire.massmutual.com>. The investment return and the principal value of an investment will fluctuate; so an investor's shares/units, when redeemed, may be worth more or less than their original cost. Investment portfolio statistics change over time. The investment is not FDIC-insured, may lose value and is not guaranteed by a bank or other financial institution.

Some plan investments may be made available through an unregistered group annuity contract issued to your plan by the Massachusetts Mutual Life Insurance Company ("MassMutual"). If that is the case, those plan investments 1.) may be in a separate investment account of MassMutual that purchases shares/units of one or more underlying investments, or 2.) may be invested directly in the investment via a separate arrangement between your plan and a trust company.

Pre-inception Returns

For newer share classes, Morningstar may provide adjusted historical returns based on the oldest surviving share class of a fund with at least three years of performance history. This enables companies to showcase the complete history of an investment. Morningstar calculates these returns by adjusting the initial share class performance for any difference in fee structure. However, if using the expenses of the newer share class rather than the expenses of the older share class would result in better performance, then pre-inception performance represents that of the older share class without any expense adjustment. The fees and expenses are referenced in the report's Operations section. Adjusted historical returns are not actual returns. Calculation methodologies utilized by Morningstar may differ from those applied by other entities, including the investment itself.

Performance

These figures reflect performance without adjusting for sales charges or the effects of taxation. They are adjusted, however, to reflect all actual ongoing fund expenses and assume reinvestment of dividends and capital gains. Returns are compared to an appropriate benchmark peer group to help investors evaluate performance. The investment's performance is generally compared with that of an index. The index is an unmanaged portfolio of specified securities and does not reflect any initial or ongoing expenses nor can it be invested in directly. An investment's portfolio may differ significantly from the securities in the index. The Index may not be the same as the comparative index noted in the investment's prospectus (if applicable).

Gross Expense Ratio/Net Expense Ratio

Expense ratios reflect the percentage of the investment's assets paid for operating expenses and management fees. In contrast to net expense ratios, gross expense ratios do not reflect any fee waivers in effect during the time period, which are typically disclosed alongside the expense ratios themselves. Net expense ratios reflect the fees actually borne by investors during the period they are in effect. Investment expense information (including waiver information) is pulled from an investment's most recent prospectus, if applicable. If an additional separate investment account fee applies, it is added to the gross and net expense ratio listed in the prospectus or other source of the expense information and factored into the performance of the separate investment account.

Unitized Plan Fund

If this is a unitized plan fund, it will invest in shares of the referenced underlying investment. Depending on the level of administrative services revenue ("ASR") generated from the underlying investment and MassMutual's target ASR for the plan, on a periodic basis MassMutual will make adjustments to the unitized plan fund's expense to cause each unitized plan fund to produce ASR equal to the target ASR. If the ASR MassMutual receives from the underlying investment is more than MassMutual's target ASR, MassMutual will allocate to the unitized plan fund a share of the revenue MassMutual received from the underlying investment so that the net expense of the unitized plan fund equals MassMutual's

target revenue. If the ASR MassMutual receives from an underlying investment is less than MassMutual's target ASR, MassMutual will redeem shares or units from the underlying investment such that the amount of the revenue received from the underlying investment for administrative services and the redeemed share or units equals MassMutual's target revenue. As a result of this process, the reported performance and expenses of the unitized plan fund is based on but not identical to the performance and expenses reported for the underlying investment.

Maximum Sales Charge/12b-1 Fee/Redemption Fee

Maximum Sales Charges and Redemption Fees are waived for MassMutual retirement plan participants. In addition, 12b-1 Fees are a component of the Net and Gross Expense Ratio; they are not in addition to the overall expense ratio.

Morningstar Rating™

This brings load-adjustments, performance (returns) and risk together into one evaluation. To determine a fund's star rating for a given time period (three, five, or 10 years), the fund's risk-adjusted return is plotted on a bell curve: If the fund scores in the top 10% of its category, it receives 5 stars (Highest); if it falls in the next 22.5% it receives 4 stars (Above Average); a place in the middle 35% earns 3 stars (Average); those lower still, in the next 22.5%, receive 2 stars (Below Average); and the bottom 10% get only 1 star (Lowest). The Overall Morningstar Rating is a weighted average of the available three-, five-, and 10-year ratings.

Morningstar Proprietary Statistics

Some Morningstar proprietary calculations, including the Morningstar Rating, Morningstar Return, and Morningstar Risk may be calculated based on pre-inception returns. See the above pre-inception returns disclosure for more details. For definitions of these statistics including credit quality, visit <https://retire.massmutual.com/retire/pdf/folder/investments/mstrdisclosure>

Investment Risk

Money market investments are not insured or guaranteed by the Federal Deposit Insurance Corporation or any other government agency.

Although these investments seek to preserve the value of your investment at \$1.00 per share, they cannot guarantee that they will do so. The fund's sponsor has no legal obligation to provide financial support to a money market option; and you should not expect that the sponsor will provide financial support to the fund at any time. You could lose money by investing in a money market option. The 7-day yield is a measure of performance in the interest rates of money market funds. To the extent total returns differ from the 7-day yield, the 7-day yield more accurately reflects the current earnings of the fund.

Risks of investing in debt securities investments include the risk that a bond issuer will default by failing to repay principal and interest in a timely manner (credit risk) and/or the risk that the value of these securities will decline when interest rates increase (interest rate risk).

Risks of investing in inflation-protected bond investments include credit risk and interest rate risk. Neither the bond investment nor its yield is guaranteed by the U.S. government.

High-yield bond investments are generally subject to greater market fluctuations and risk of loss of income and principal than lower-yielding debt securities investments.

Investments that track a benchmark index are professionally managed. However, the benchmark index itself is unmanaged and does not incur fees or expenses and cannot be purchased directly.

Investments in value stocks may remain undervalued for extended periods of time, and the market may not recognize the intrinsic value of these securities.

Investments in growth stocks may experience price volatility due to their sensitivity to market fluctuations and dependence on future earnings expectations.

Investments in companies with small or mid market capitalization ("small caps" or "mid caps") may be subject to special risks given their characteristic narrow markets, limited financial resources, and less liquid stocks, all of which may cause price volatility.

International/global investing can involve special risks, such

as political changes and currency fluctuations. These risks are heightened in emerging markets.

A significant percentage of the underlying investments in aggressive asset allocation portfolio investments have a higher than average risk exposure. Investors should consider their risk tolerance carefully before choosing such a strategy. An investment with multiple underlying investments (which may include MM RetireSMART™ by JP Morgan and any other offered proprietary or non-proprietary asset-allocation, lifestyle (risk based), lifecycle (target date) or custom blended investments) may be subject to the expenses of those underlying investments in addition to those of the investment itself.

Investments may reside in the specialty category due to 1) allowable investment flexibility that precludes classification in standard asset categories and/or 2) investment concentration in a limited group of securities or industry sectors. Investments in this category may be more volatile than less-flexible and/or less-concentrated investments and may be appropriate as only a minor component in an investor's overall portfolio.

Participants with a large ownership interest in a company or employer stock investment may have the potential to manipulate the value of units of this investment option through their trading practices. As a result, special transfer restrictions may apply. This type of investment option presents a higher degree of risk than diversified investment options under the plan because it invests in the securities of a single company.

Investments that invest more of their assets in a single issuer or industry sector (such as company stock or sector investments) involve additional risks, including unit price fluctuations, because of the increased concentration of investments.

A participant will be prohibited from transferring into most mutual funds and similar investments if they have transferred into and out of the same investment within the previous 60 days. Certain stable value, guaranteed interest, fixed income and other investments are not subject to this rule. This rule does not prohibit participants from transferring out of any investment at any time.

Target Date (lifecycle)

Generally these investment options are designed to be held beyond the presumed retirement date to offer a continuing investment option for the investor in retirement. The year in the investment option name refers to the approximate year an investor in the option would plan to retire and likely would stop making new contributions to the investment option. However, investors may choose a date other than their presumed retirement date to be more conservative or aggressive depending on their own risk tolerance.

They are designed for participants who plan to withdraw the value of their accounts gradually after retirement. Each of these options follows its own asset allocation path ("glide path") to progressively reduce its equity exposure and become more conservative over time. Options may not reach their most conservative allocation until after their target date. Others may reach their most conservative allocation in their target date year. Investors should consider their own personal risk tolerance, circumstances and financial situation. These options should not be selected solely on a single factor such as age or retirement date. Please consult the prospectus (if applicable) pertaining to the options to determine if their glide path is consistent with your long-term financial plan. Target retirement date investment options' stated asset allocation may be subject to change.

Investments in these options are not guaranteed and you may experience losses, including losses near, at, or after the target date. Additionally, there is no guarantee that the options will provide adequate income at and through retirement.

Investors should consider an investment's objectives, risks, charges and expenses carefully before investing.

For this and other information, see a fact sheet (investment profile) or the prospectus, if applicable. You may obtain a prospectus or fact sheet from your plan sponsor or by visiting <https://retire.massmutual.com>. Read it carefully before investing.

MassMutual RetireSMART by JPM 2045 R4 MMKZX

Benchmark

Morningstar Lifetime Mod 2045 TR USD

Overall Morningstar Rating™

★★

Out of 188 Target-Date 2045 funds. An investment's overall Morningstar Rating, based on its risk-adjusted return, is a weighted average of its applicable 3-, 5-, and 10-year Ratings. See disclosure for details.

Morningstar Return

Below Average

Morningstar Risk

Above Average

Investment Objective & Strategy

From investment's prospectus

The investment seeks total return through its asset allocation, which is designed to become more conservative over time; as the fund approaches and passes the target retirement date, the fund's objective will shift to seeking current income and some capital appreciation.

The fund is a "fund of funds" and seeks to achieve its investment objective by investing in a combination of U.S. domestic and international mutual funds ("underlying funds") using an asset allocation strategy designed for investors expecting to retire at age 65 around the year 2045 and likely to stop making new investments in the fund at or around that time.

Fees and Expenses as of 03-18-21

Prospectus Net Expense Ratio	1.00%
Total Annual Operating Expense	1.16%
Maximum Sales Charge	—
12b-1 Fee	0.25%
Redemption Fee/Term	—

Waiver Data	Type	Exp. Date	%
ExpenseRatio	Contractual	01-31-22	0.16

Operations and Management

Fund Inception Date	04-01-14
Portfolio Manager(s)	Frederick(Rick) Schulitz, CFA Daniel Oldroyd, CFA
Name of Issuer	MassMutual
Telephone	888-309-3539
Web Site	www.massmutual.com

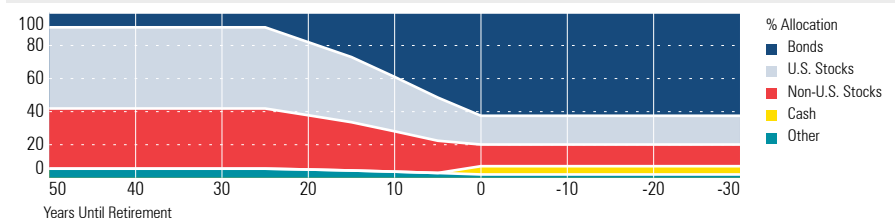
Benchmark Description: Morningstar Lifetime Mod 2045 TR USD

The index measures the performance of a portfolio of global equities, bonds and traditional inflation hedges such as commodities and TIPS. This portfolio is held in proportions appropriate for a US investor who has a target maturity date of 2045. The Moderate risk profile is for investors who are comfortable with average exposure to equity market volatility. This Index does not incorporate Environmental, Social, or Governance (ESG) criteria.

Category Description: Target-Date 2045

Target-date portfolios provide diversified exposure to stocks, bonds, and cash for those investors who have a specific date in mind (in this case, the years 2041-2045) for retirement. These portfolios aim to provide investors with an optimal level of return and risk, based solely on the target date. Management adjusts the allocation among asset classes to more-conservative mixes as the target date approaches, following a preset glide path. A target-date portfolio is part of a series of funds offering multiple retirement dates to investors.

Allocation of Assets



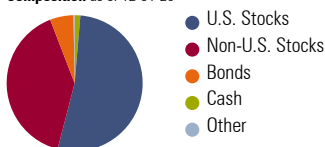
Performance

Trailing Returns	YTD	1 Year	3 Year	5 Year	10 Year	Since Inception
Investment Return %	5.30	52.47	11.08	11.77	—	8.00
Benchmark Return %	4.99	51.57	11.11	12.40	—	8.82
Category Average %	4.87	50.64	11.58	12.43	—	8.95
Morningstar Rating™	—	—	★★	★★	—	—
# of Funds in Category	—	—	188	148	—	—
Quarter End Returns as of 03-31-21	YTD	1 Year	3 Year	5 Year	10 Year	Since Inception
Fund Return %	5.30	52.47	11.08	11.77	—	8.00
Standardized Return %	5.30	52.47	11.08	11.77	—	8.00

Performance Disclosure: The performance data quoted represents past performance and does not guarantee future results. The investment return and principal value of an investment will fluctuate; thus an investor's shares, when redeemed, may be worth more or less than their original cost. Current performance may be lower or higher than return data quoted herein. For performance data current to the most recent month-end please visit the website listed under Operations and Management on this page.

Portfolio Analysis as of 12-31-20

Composition as of 12-31-20

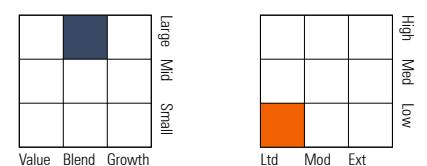


Top 10 Holdings as of 12-31-20

	% Assets
MM Select Equity Asset I	20.46
MassMutual Select Overseas I	17.25
Vanguard Emerging Mkts Stock Idx Instl	6.75
MassMutual Select Blue Chip Growth I	6.11
MassMutual Premier High Yield I	4.89
MassMutual Premier International Eq I	4.23
MassMutual Select Equity Opports I	4.03
MassMutual Select Fundamental Value I	4.03
JPMorgan International Rsrch Enh Eq R6	4.01
MassMutual Select Diversified Value I	4.00

Total Number of Holdings	27
Annual Turnover Ratio %	95.00
Total Fund Assets (\$mil)	156.03

Morningstar Style Box™ as of 12-31-20(EQ) ; 12-31-20(F-I)



Morningstar Sectors as of 12-31-20

	% Fund	S&P 500 %
Cyclical	40.01	31.21
Basic Materials	4.58	2.35
Consumer Cyclical	12.59	12.20
Financial Services	15.95	14.20
Real Estate	6.89	2.46
Sensitive	37.20	46.42
Communication Services	8.05	10.93
Energy	2.36	2.80
Industrials	11.36	9.21
Technology	15.43	23.48
Defensive	22.79	22.37
Consumer Defensive	7.82	6.58
Healthcare	12.74	13.12
Utilities	2.23	2.67

Principal Risks as of 12-31-20

Hedging Strategies, Credit and Counterparty, Inflation/Deflation, Inflation-Protected Securities, Currency, Emerging Markets, Foreign Securities, Loss of Money, Not FDIC Insured, Country or Region, Growth Investing, Value Investing, Index Correlation/Tracking Error, Market/Market Volatility, Bank Loans, Commodity, Convertible Securities, Distressed Investments, Equity Securities, High-Yield Securities, Industry and Sector Investing, Mortgage-Backed and Asset-Backed Securities, Preferred Stocks, Repurchase Agreements, Restricted/Illiquid Securities, Underlying Fund/Fund of Funds, U.S. Government Obligations, Derivatives, Pricing, Fixed-Income Securities, Dollar Rolls, Sovereign Debt, Cash Drag, Forwards, Management, Target Date, Small Cap, Mid-Cap, Large Cap, Real Estate/REIT Sector