



## RILA indexed strategy options and index analysis

A comprehensive guide to indexed strategies available on MassMutual Ascend Life Insurance Company's registered index-linked annuities, with index analysis using rolling returns

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With a registered index-linked annuity (RILA) from MassMutual Ascend, you aren't investing your money directly in the market. Instead, you allocate funds to indexed strategies, which provide market-linked growth potential and partial downside protection.

Indexed strategies are linked to a variety of indexes and ETFs, and offer several types of upside potential and downside protection factors. Here's a breakdown of the different components that make up our indexed strategies.

### Each indexed strategy consists of the following four components

INDEX OR ETF	TERM LENGTH	DOWNSIDE PROTECTION FACTOR	UPSIDE POTENTIAL FACTOR
S&P 500 Index	1-Year	0% Floor	Cap
Russell 2000 Index	2-Year	-10% Floor	Upside Participation Rate
iShares MSCI EAFE ETF	3-Year	50% Downside Participation Rate	Performance Trigger
iShares U.S. Real Estate ETF	6-Year	10% Buffer	Dual Performance Trigger
SPDR Gold Shares ETF			
First Trust Barclays Edge Index			

## INDEXES AND ETFS

available on MassMutual Ascend's RILA strategies

<b>S&amp;P 500 Index</b>	One of the most commonly followed equity indices, this index tracks stocks issued by 500 of the top companies in leading industries of the U.S. economy.
<b>Russell 2000 Index</b>	Seeks to provide a comprehensive, unbiased barometer of the small cap segment of the U.S. equity market by measuring the performance of about 2,000 small-cap U.S. equities from various industries.
<b>iShares MSCI EAFE ETF</b>	Seeks to track the investment results of an index composed of developed market equities, including those in Europe, Australia, Asia and the Far East, but excluding the U.S. and Canada.
<b>iShares U.S. Real Estate ETF</b>	Seeks to track the performance of the Dow Jones U.S. Real Estate Index, which is composed primarily of U.S. equities in the real estate sector and real estate investment trusts (REITs).
<b>SPDR Gold Shares ETF</b>	Designed to reflect the market value of gold bullion.
<b>First Trust Barclays Edge Index</b>	Seeks to provide equity and fixed income exposure through a blend of the Capital Strength Index™ and Value Line Dividend Index™ and Barclays' US 2-year Treasury Futures, 5-year Treasury Futures and 10-year Note Futures Indexes while aiming to control risk by maintaining a volatility target at or below 7%. Since the index is on an excess return basis (i.e., it returns the index performance in excess of risk-free rates), the risk free return is deducted from the equity underliers. The risk free rate used in this calculation is the U.S. Fed Funds Rate published by the Federal Reserve of New York (ticker: FEDL01) for each day divided by 360. No such adjustment is needed to the US Treasury futures indexes as these securities returns are naturally on an excess return basis.

## TERM LENGTHS

available on MassMutual Ascend's RILA strategies

<b>1-Year</b>	Interest is credited at the end of a 1-year period
<b>2-Year</b>	Interest is credited at the end of a 2-year period
<b>3-Year</b>	Interest is credited at the end of a 3-year period
<b>6-Year</b>	Interest is credited at the end of a 6-year period

Strategies linked to the S&P 500® Index (SPX), the Russell 2000 Index (RTY), the iShares MSCI EAFE ETF (EFA), the iShares U.S. Real Estate ETF (IYR), and the SPDR Gold Shares ETF (GLD) provide returns based, in part, on the change in the price of the Index or ETF. The price change does not include dividends that might be paid on the underlying investments of the Index or ETF.

Strategies linked to the First Trust Barclays Edge Index (FTEDGE7) provide returns based, in part, on the change in net asset value of the underlying investments of the Index. The net asset value change includes dividends that might be paid on the underlying investments of the Index. The launch date for this index was 4/14/2023.

Not all strategies available with all indexes and ETFs.

3-year term strategies only available for terms that start in the first four contract years.

6-year term strategies only available for terms that start in the first contract year.

## DOWNSIDE PROTECTION FACTORS

available on MassMutual Ascend's RILA strategies

<b>0% Floor</b>	Provides complete protection against index losses at the end of each term. Regardless of negative index change, strategy value will not decrease.
<b>-10% Floor</b>	Provides protection against index losses in excess of -10% each term. If the negative index change is between 0% and -10%, the strategy value will decrease by the negative index change. If the negative index change is greater than -10%, the strategy value decrease is limited to -10%.
<b>50% Downside Participation Rate</b>	Provides protection against half of index losses each term. If the index change is negative at the end of a term, the strategy value decreases, limited by the 50% downside participation rate.
<b>10% Buffer</b>	Provides protection against the first 10% of index losses each term. If the negative index change is between 0 and -10%, the strategy value will not decrease. If the negative index change is greater than -10%, the strategy value will decrease by the remaining loss in excess of -10%.
<b>20% Buffer</b>	Provides protection against the first 20% of index losses each term. If the negative index change is between 0% and -20%, the strategy value will not decrease. If the negative index change is greater than -20%, the strategy value will decrease by the remaining loss in excess of -20%.

## UPSIDE POTENTIAL FACTORS

available on MassMutual Ascend's RILA strategies

<b>Cap</b>	Offers earning potential up to a cap that is set for each term. If the index change is positive at the end of a term, the strategy value grows, up to the cap.
<b>Upside Participation Rate</b>	Offers earning potential limited by an upside participation rate that is set for each term. If the index change is positive at the end of a term, the index change is multiplied by the upside participation rate to determine the strategy value increase.
<b>Performance Trigger</b>	Offers earning potential up to the trigger rate that is set for each term. The trigger rate is credited when index performance is positive or level.
<b>Dual Performance Trigger</b>	Offers earning potential up to the trigger rate that is set for each term. The trigger rate is credited when index performance is positive, level, or when the index loss does not exceed the buffer, which is 10% on all dual performance trigger strategies.

Not all combinations of Indexes/ETFs, term lengths, downside protection factors and upside potential factors are available. Strategy availability varies by registered index-linked annuity product, by state and by distribution.

Some registered index-linked annuities have a fee that is deducted from each indexed strategy on a daily basis. The fee for any given day is calculated as a percentage of and is subtracted from the then remaining investment base of an indexed strategy. The above Downside Protection Factors section only describes how strategy performance is affected by the downside limits, without taking fees into account.

To learn more about the specific RILAs available to you and their various features, including fees, talk with your financial professional.

## INDEX ANALYSIS USING ROLLING RETURNS

The data in the following tables uses 1-year rolling returns<sup>1</sup> of the applicable index or ETF to highlight average performance, positive performance, negative performance and return distribution.

	1-Year Term S&P 500 Index (SPX) 12/31/2003 – 12/31/2023 4,957 observations <sup>2</sup>	1-Year Term iShares MSCI EAFE ETF 12/31/2003 – 12/31/2023 4,957 observations <sup>5</sup>
<b>Average Performance</b>		
Average Return	8.55%	3.95%
Average Gain	14.48%	16.00%
Average Loss	-14.33%	-13.33%
<b>Positive Performance</b>		
Maximum Return	74.77% <sup>3</sup>	73.02% <sup>6</sup>
Number of Gains	3,936 (79%)	2,919 (59%)
<b>Negative Performance</b>		
Minimum Return	-48.82% <sup>4</sup>	-55.85% <sup>7</sup>
Number of Losses	1,020 (21%)	2,034 (41%)
<b>Return Distribution</b>		
-100% to -20%	5.10%	7.24%
-20% to -10%	4.90%	12.87%
-10% to 0%	10.57%	20.92%
0% to 10%	27.11%	16.74%
10% to 20%	35.40%	25.32%
20% to ∞	16.91%	16.91%

<sup>2</sup>One flat year, in which the return was 0%, included in observations

<sup>3</sup>Max return:  
1-yr period ending 3/23/2021

<sup>4</sup>Min return:  
1-yr period ending 3/5/2009

<sup>5</sup>Four flat years, in which the return was 0%, included in observations

<sup>6</sup>Max return:  
1-yr period ending 3/9/2010

<sup>7</sup>Min return:  
1-yr period ending 11/20/2008

	1-Year Term	1-Year Term
	iShares U.S. Real Estate ETF 12/31/2004 – 12/31/2023 4,697 observations <sup>8</sup>	SPDR Gold Shares ETF 12/31/2004 – 12/31/2023 4,697 observations <sup>11</sup>
<b>Average Performance</b>		
Average Return	4.38%	9.43%
Average Gain	17.52%	18.82%
Average Loss	-15.29%	-8.05%
<b>Positive Performance</b>		
Maximum Return	116.25% <sup>9</sup>	68.69% <sup>12</sup>
Number of Gains	2,816 (60%)	3,056 (65%)
<b>Negative Performance</b>		
Minimum Return	-64.09% <sup>10</sup>	-29.28% <sup>13</sup>
Number of Losses	1,880 (40%)	1,638 (35%)
<b>Return Distribution</b>		
-100% to -20%	10.54%	2.75%
-20% to -10%	9.60%	6.94%
-10% to 0%	19.89%	25.19%
0% to 10%	20.35%	21.33%
10% to 20%	19.12%	13.60%
20% to ∞	20.50%	30.19%

<sup>8</sup>One flat year, in which the return was 0%, included in observations

<sup>9</sup>Max return:  
1-yr period ending 3/8/2010

<sup>10</sup>Min return:  
1-yr period ending 3/5/2009

<sup>11</sup>Three flat years, in which the return was 0%, included in observations

<sup>12</sup>Max return:  
1-yr period ending 5/12/2006

<sup>13</sup>Min return:  
1-yr period ending 11/26/2013

## INDEX ANALYSIS USING 2-YEAR ROLLING RETURNS

The data in the following tables uses 2-year rolling returns<sup>1</sup> of the applicable index or ETF to highlight average performance, positive performance, negative performance and return distribution.

2-Year Term	
S&P 500 Index (SPX)	
12/31/2003 – 12/31/2023	
4,697 observations <sup>2</sup>	
Average Performance	
Average Return	17.67%
Average Gain	24.63%
Average Loss	-21.47%
Positive Performance	
Maximum Return	99.15% <sup>3</sup>
Number of Gains	3,988 (85%)
Negative Performance	
Minimum Return	-51.77% <sup>4</sup>
Number of Losses	709 (15%)
Return Distribution	
-100% to -20%	7.56%
-20% to -10%	3.32%
-10% to 0%	4.22%
0% to 10%	12.99%
10% to 20%	26.89%
20% to ∞	45.03%

<sup>2</sup>Zero flat years, in which the return was 0%, included in observations

<sup>3</sup>Max return: 2-yr period ending 3/23/2022

<sup>4</sup>Min return: 2-yr period ending 3/9/2009



## INDEX ANALYSIS USING 3-YEAR ROLLING RETURNS

The data in the following tables uses 3-year rolling returns<sup>5</sup> of the applicable index or ETF to highlight average performance, positive performance, negative performance and return distribution.

3-Year Term	
S&P 500 Index (SPX)	
12/31/2003 – 12/31/2023	
4,437 observations <sup>6</sup>	
Average Performance	
Average Return	27.77%
Average Gain	37.79%
Average Loss	-20.62%
Positive Performance	
Maximum Return	102.61% <sup>7</sup>
Number of Gains	3,676 (83%)
Negative Performance	
Minimum Return	-46.97% <sup>8</sup>
Number of Losses	761 (17%)
Return Distribution	
-100% to -20%	10.68%
-20% to -10%	2.77%
-10% to 0%	3.70%
0% to 10%	2.75%
10% to 20%	3.52%
20% to ∞	76.58%

<sup>6</sup>Zero flat years, in which the return was 0%, included in observations

<sup>7</sup>Max return: 3-yr period ending 3/9/2012

<sup>8</sup>Min return: 3-yr period ending 3/5/2009

<sup>5</sup>Rolling returns refers to every 3-year period that started on a business day within the listed date range

## INDEX ANALYSIS USING 6-YEAR ROLLING RETURNS

The data in the following tables uses 6-year rolling returns<sup>1</sup> of the applicable index or ETF to highlight average performance, positive performance, negative performance and return distribution.

	6-Year Term S&P 500 Index (SPX) 12/31/2003 – 12/31/2023 3,653 observations <sup>2</sup>	6-Year Term Russell 2000 12/31/2003 – 12/31/2023 3,653 observations <sup>5</sup>
<b>Average Performance</b>		
Average Return	64.80%	58.07%
Average Gain	68.74%	58.66%
Average Loss	-3.39%	-4.84%
<b>Positive Performance</b>		
Maximum Return	207.76% <sup>3</sup>	256.44% <sup>6</sup>
Number of Gains	3,454 (95%)	3,619 (99%)
<b>Negative Performance</b>		
Minimum Return	-10.39% <sup>4</sup>	-17.75% <sup>7</sup>
Number of Losses	199 (5%)	34 (1%)
<b>Return Distribution</b>		
-100% to -20%	0.00%	0.00%
-20% to -10%	0.03%	0.16%
-10% to 0%	5.42%	0.77%
0% to 10%	17.19%	7.36%
10% to 20%	5.04%	13.25%
20% to ∞	72.32%	78.46%

<sup>2</sup>Zero flat years, in which the return was 0%, included in observations

<sup>3</sup>Max return: 6-yr period ending 3/5/2015

<sup>4</sup>Min return: 6-yr period ending 10/3/2011

<sup>5</sup>Zero flat years, in which the return was 0%, included in observations

<sup>6</sup>Max return: 6-yr period ending 3/9/2015

<sup>7</sup>Min return: 6-yr period ending 3/18/2020

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