

Understanding external economic factors and their impacts on RILA renewal rates

50% downside participation rate strategy with a 75% upside participation rate



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How options are used to hedge risk on annuities

Insurance companies buy and sell options to hedge against upside and downside risk associated with the annuities they offer, which allow customers to participate in index performance. The cost of and payoffs from these options are taken into account when determining the upside potential offered on the indexed strategies available on their products.

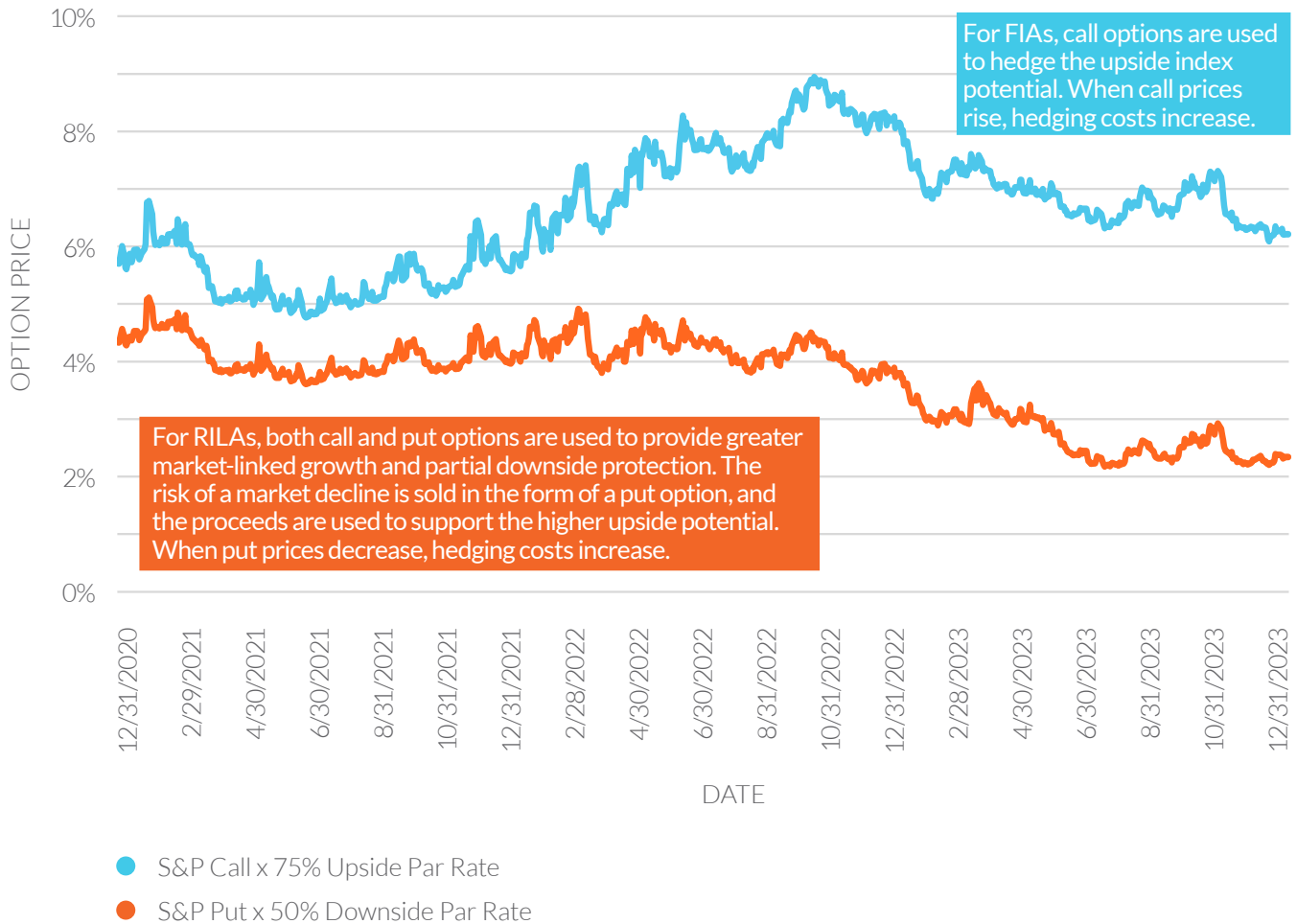
For fixed-indexed annuities (FIAs) – which feature complete downside protection and some upside potential – call options are used to hedge risk. For registered index-linked annuities (RILAs) – which feature greater upside potential and partial downside protection – call and put options are used to hedge risk.

	Fixed-Indexed Annuities	Registered Index-Linked Annuities
Call Options	✔	✔
Put Options		✔

In exchange for taking on additional risk, RILA contract owners receive greater growth potential in the form of a higher upside participation rate. The insurance company sells the risk of a market decline in the form of a put option – and uses the proceeds to help support the purchase of a more competitive call option – to help support the higher upside potential.

In the following graph, you can see the fluctuating option costs associated with offering a 75% upside participation rate and a 50% downside participation rate on a 1-year S&P 500 strategy.

CALL AND PUT OPTION PRICES



Each option price is stated as a percentage of the Index at the last Market Close on or before the first day of the Term. The option price is an average of the bid-ask prices for hypothetical ATM options.

Impact of interest rates on option budget

Typically, when interest rates rise, an insurance company has additional resources – or a larger budget – to buy options and set upside potential available on their annuities. In periods where interest rates are higher, policies will be issued with generally higher option budgets. Correspondingly, in periods where interest rates are lower, policies will be issued with generally lower option budgets. At MassMutual Ascend, our investment portfolio is invested in a mix of corporate bonds and other fixed securities. As interest rates rise, earnings on our investment portfolio tend to rise and help support higher option budgets.

However, the Net Option Cost also impacts what an insurance company can afford. The Net Option Cost can be thought of as the net cost of buying calls and selling puts to hedge the indexed strategy and support the upside participation rates offered to clients.

Here’s how the Net Option Cost is calculated for a strategy with an upside and downside participation rate:

$$\left(\begin{array}{l} \text{Upside Participation Rate} \\ \times \text{ Call Option}^1 \end{array} \right) - \left(\begin{array}{l} \text{Downside Participation Rate} \\ \times \text{ Put Option}^2 \end{array} \right)$$

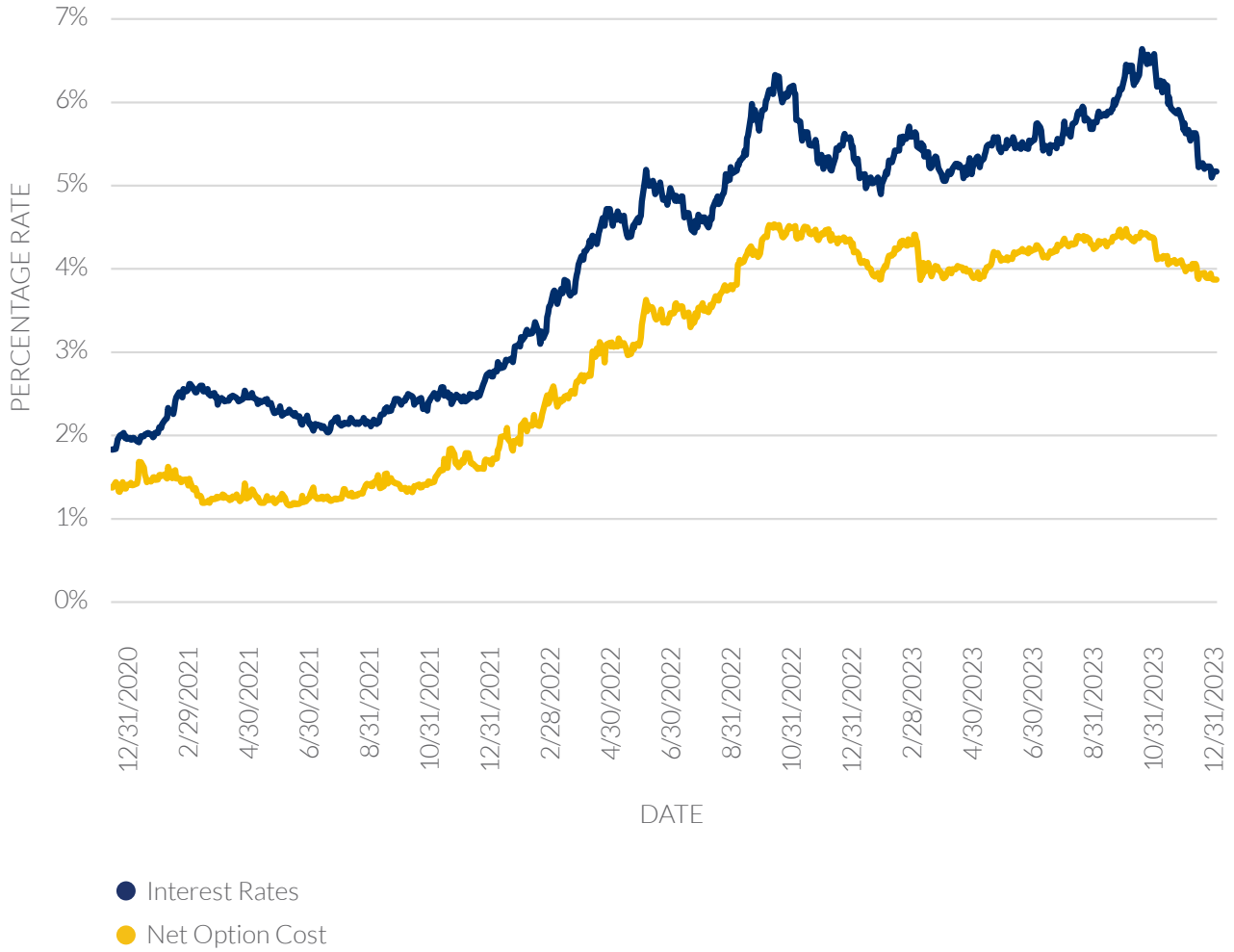
The following graph shows the Net Option Cost for a 1-year S&P 500 50% downside participation rate strategy with a 75% upside participation rate in relation to interest rates³. In 2022, you can see that while interest rates rose rapidly, the Net Option Cost rose rapidly too.

¹ATM Call Option Price: The calculated price of a hypothetical at-the-money call option. The hypothetical at-the-money call option is one that will pay the holder an amount equal to the percentage rise, if any, in the Index from the last Market Close on or before the start of a Term to the final Market close of that Term. The price is stated as a percentage of the Index at the last Market Close on or before the first day of the Term. The price is an average of the bid-ask prices for the hypothetical option.

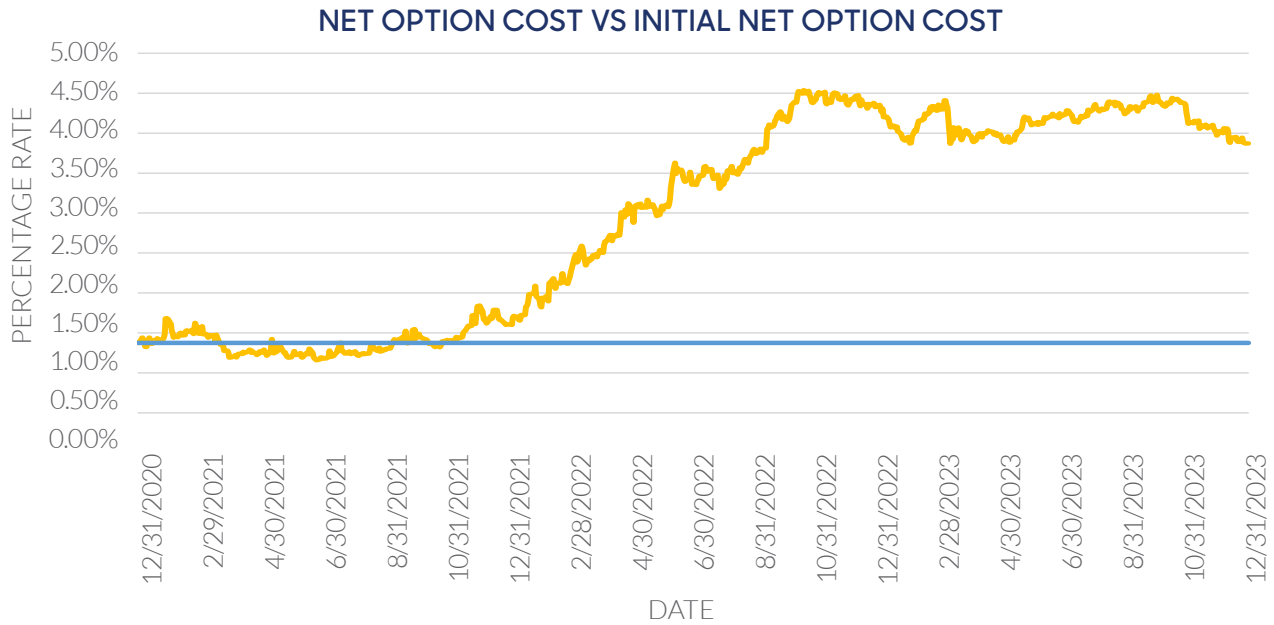
²ATM Put Option Price: The calculated price of a hypothetical at-the-money put option. The hypothetical at-the-money put option is one that will pay the holder an amount equal to the percentage fall, if any, in the Index from the last Market Close on or before the start of a Term to the final Market Close of that Term. The price is stated as a percentage of the Index at the last Market Close on or before the first day of the Term. The price is an average of the bid-ask prices for the hypothetical option.

³Interest Rates throughout the entirety of this brochure are represented by the ICE BofA 7-10 Year US Corporate Index Effective Yield, Percent, Daily, Not Seasonally Adjusted

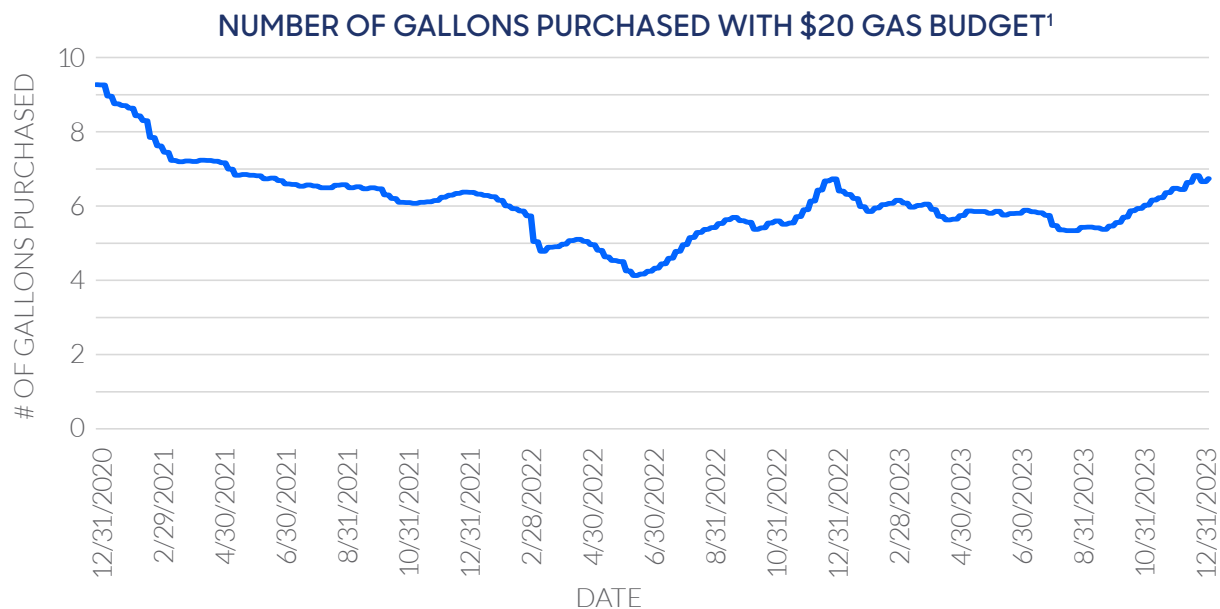
NET OPTION COST VS INTEREST RATES



It's important to note that insurance companies set their option budget at the inception of an annuity policy, meaning that option budget is used not only to set initial rates, but also renewal rates for future terms. If the Net Option Cost decreases, an insurance company can buy more options with their budget, allowing for more generous renewal rates. If the Net Option Cost increases, an insurance company cannot afford as much with their budget, resulting in more conservative renewal rates.



This is virtually the same concept as how inflation impacts everyday goods. Consider the amount of gas you could purchase with \$20 in early 2021 vs. mid-2022 – inflation has the same effect on financial products.

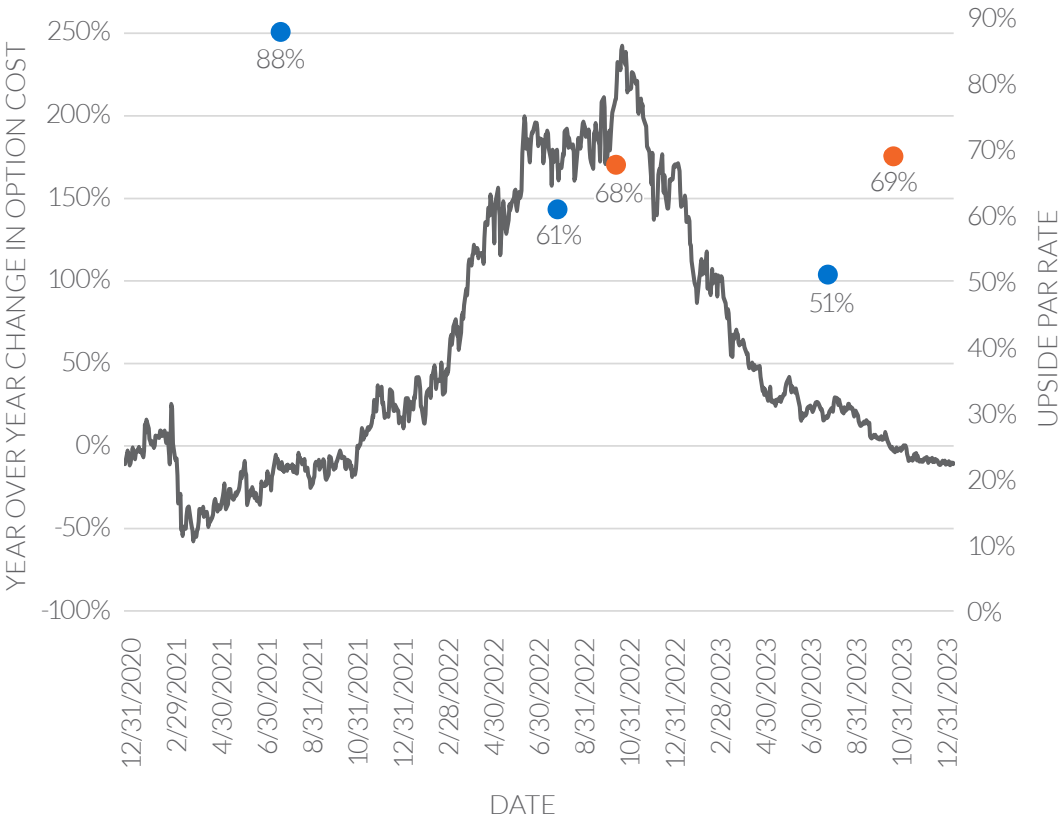


¹FRED (Federal Reserve Economic Data) - US Regular Conventional Gas Price, Dollars Per Gallon, Weekly, Not Seasonally Adjusted

Renewals in action

The graph below shows the annual change in Net Option Cost to offer a 75% upside participation rate on a strategy with a 50% downside participation rate. When the change in Net Option Cost is above 0%, that means it is increasing year over year, which would have a negative effect on renewal upside participation rates. When the change in Net Option Cost is below 0%, that means it is decreasing year over year, which would have a positive effect on renewal upside participation rates. In 2022, Net Option Costs increased drastically, resulting in decreased renewal rates.


ANNUAL YEAR OVER YEAR CHANGE IN NET OPTION COST



For Example Policy 1, new money was deposited on 07/21/21. Option costs increased in 2022, and the renewal par rate for this policy was lower than the new money par rate. In 2023 option costs increased further, and the 2023 renewal par rate was lower than the 2022 renewal par rate.

For Example Policy 2, new money was deposited on 10/7/22. Option costs decreased in late 2023, and the renewal par rate for this policy was slightly higher than the new money par rate.

- Year Over Year Change in Net Option Cost
- Example Policy 1, Issued 7/21/2021
- Example Policy 2, Issued 10/7/2022



The complexities of RILA pricing will naturally result in fluctuations to new money and renewal rates. It is important that financial professionals and clients understand that RILAs are securities and are subject to volatility – including volatility in the upside potential that an insurance company can offer, due to outside economic factors such as inflation and market fluctuations.

Data computed by MassMutual Ascend actuaries using market data from HISMarkit and FRED (Federal Reserve Economic Data).
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