TIAA-CREF Institute

Valuing Variable Annuities with Guaranteed Minimum Lifetime Withdrawal Benefits

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About the research

Variable annuities offer retirees the security of a lifelong retirement income stream combined with capital market access via an investment portfolio. A popular option is the guaranteed minimum lifetime withdrawal benefit (GLWB) rider, which provides the buyer lifetime income benefits along with flexible withdrawals.

The study summarized here, Valuing Variable Annuities with Guaranteed Minimum Lifetime Withdrawal Benefits by Petra Steinorth of St. John's University and Olivia S. Mitchell of The Wharton School of the University of Pennsylvania, investigates how risk-averse retirees can optimally withdraw from these products, balancing returns and the embedded longevity protection.

The researchers also gauge the product's utility value for risk-averse retirees, concluding that the value generally exceeds that of a similar mutual fund.

To read the full report, click the study link above or see: Steinorth, Petra and Olivia S. Mitchell. (2015). "Valuing Variable Annuities with Guaranteed Minimum Lifetime Withdrawal Benefits." *Insurance: Mathematics and Economics*. 64: 246-258

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Financial Services

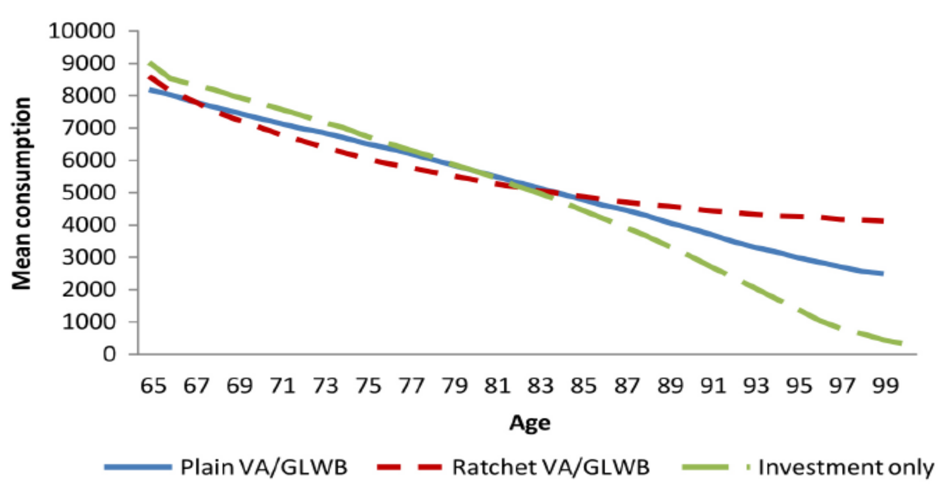
Variable annuities can be a useful substitute for defined benefit pensions, depending on pricing and individual risk preferences

Variable annuities with guaranteed minimum lifetime withdrawal benefits (VA/GLWB) offer retirees longevity protection, upside exposure to equity markets, and access to savings in case of emergencies. Despite these benefits, few researchers have explored how risk-averse retirees might value VA/GLWBs. To shed light on this issue, economists Petra Steinorth and Olivia S. Mitchell used Monte-Carlo simulations to generate a range of possible consumption outcomes for a stylized VA/GLWB product and developed two ways to assess its appeal.

Increased Consumption Later in Life

The graph below shows the average consumption path for three portfolio alternatives: investment brokerage account only, plain VA/GLWB, and ratchet VA/GLWB. The ratchet enhancement boosts the guarantee value of the VA if the account value grows to exceed the guarantee value at certain pre-specified dates.

Mean Consumption Conditional on Survival Under Three Portfolio Alternatives



Mean consumption is above the Social Security benefit floor. Fees assumed for the plain VA/GLWB are 237 +75 bps and 237 + 100 bps for the ratchet VA/GLWB.

As shown, the plain VA/GLWB-holder, compared to a non-annuitant using only the investment brokerage account, has slightly lower consumption early in retirement but higher consumption later in life. The retiree with the ratchet VA/GLWB consumes slightly less than his two counterparts until reaching his mid-80s, but thereafter his consumption is substantially higher than that of the other portfolio-holders.

Perceived Value of Portfolio Options

To put a value on these portfolios, Steinorth and Mitchell calculated expected Money's Worth Ratios (MWR) and Annuity Equivalent Wealth (AEW) values. The MWR compares the expected present value of the annuity's payment stream to the money paid for the annuity. AEW is a widely-used measure of how much non-annuitized wealth someone lacking access to an annuity would be willing to pay to purchase the VA product.

To make results comparable across products, the researchers used anticipated portfolio return rates minus fees for the non-VA investment and set its MWR to one. Any divergence from one in the MWR of the VA products indicates how the VAs' higher fees reduce net returns compared to not holding the annuity. The table below shows the results.

Money's Worth Ratios and Annuity Equivalent Wealth Values for Alternative Portfolios

Portfolio (Fees)	Money's Worth Ratios	Annuity Equivalent Wealth
Investment only (126 bps)	1.00	$100,000
Plain VA/GLWB (237 + 75 bps)	0.92	$111,064
Ratchet VA/GLWB (237 + 100 bps)	0.89	$112,101

Since the MWR for the plain VA/GLWB equals 0.92 for every dollar invested, a retiree could expect to receive 92 cents in benefits. In other words, 8 cents per dollar are devoted to loads and the protections embedded in the plain VA/GLWB, compared to the non-annuity investment. For the ratchet VA/ GLWB, the MWR is 0.89, or three cents less per dollar of premium compared to the plain VA/GLWB. This reduction is greater than the fee of 0.25% (25 bps), and it results from retirees optimally selecting different withdrawal paths over their lifetimes while valuing the higher longevity protection of the ratchet. Thus, the ratchet fee of 25 bps includes some security buffer by the insurer due to the added risk.

The AEW of the plain VA/GLWB is roughly $111,000, meaning that having $100,000 in a plain VA/GLWB gives the same expected utility as $111,000 under the investment-only alternative. This 11% gain suggests the longevity protection of the product is worth more to the risk-averse retiree than the loss of 8 cents per dollar in terms of the MWR. The AEW of a ratchet VA/GLWB is around $112,000, or a 12% gain. The higher valuation is attributable to the reduced consumption decline at older ages and lower consumption volatility over time.

For more information

To learn more about converting savings to income in retirement, go to tiaa-crefinstitute.org > Research > Lifetime Income and Retirement Security