



The Milliman Hedge Cost Index™ (MHCI) provides the estimated hedging cost for a hypothetical Guaranteed Lifetime Withdrawal Benefit (GLWB) block, based on product specifications and modeling assumptions as described below. The expected hedge costs are calculated using product features for a generic GLWB in line with product designs common in the market. Likewise, the modeling assumptions are based on typical actuarial and behavioral assumptions widely used by Variable Annuity (VA) writers in the marketplace.

KEY PRODUCT FEATURES

Investment options

VA writers offer a wide range of investment options including managed risk strategies and traditional asset allocation programs. The MHCI assumes that half of the underlying investments are in a volatility controlled fund with a volatility target of 10% and the other half in a mix of three traditional asset allocation classes, i.e., Aggressive, Moderate, and Conservative. The three asset allocation classes in combination represent an overall equity allocation of around 60%.

GLWB rider fee and other charges

The MHCI is based on a rider fee assumption of 125 bps of GLWB base in line with current fee levels observed in the market. In addition, the MHCI assumes 2.25% of account value for the combined total of mortality and expense (M&E) fees and investment fees.

Lifetime withdrawal rate

Prevailing designs in the marketplace typically vary withdrawal percentage by the age at the first withdrawal. Accordingly, the MHCI is based on age-banded lifetime withdrawal rates as follows:

AGE AT FIRST WITHDRAWAL	W/D RATE
<65	4.00%
65-74	5.00%
>74	6.00%

Bonus

The GLWB product includes an annual compound interest 5.5% bonus. The bonus amount is calculated as 5.5% of the previous year's Guaranteed Withdrawal Base (GWB). The bonus benefit is available for up to 10 years while policyholders are not withdrawing.

Resets

The GLWB product includes an annual reset for the greater of 10 years and until age 80. The GWB may step up to the account value on the policy anniversary if the account value is greater than the GWB.

KEY MODELING ASSUMPTIONS

The MHCI is calculated using modeling assumptions for actuarial and policy holder behavior in line with standard industry practice.

Lapse rate

Milliman uses data from industry surveys of base lapse assumptions for a B-Share product. In addition, a dynamic lapse function is overlaid as a multiplicative factor, which will reduce lapses when the guarantee is in the money and increase lapses when the guarantee is out of the money. Milliman also makes reference to an industry study of VA surrender experience to ensure the assumption stays reasonable in light of recent experience.

Withdrawal utilization

In practice, a GLWB policyholder decides when to start withdrawing. For modeling purposes, it is assumed that a percentage of policyholders will withdraw immediately, others will wait for a few years before taking out any GLWB payment. In addition, we assume that a small percentage of the people will never withdraw.

The MHCI also models a 5% withdrawal amount inefficiency. For policies utilizing the GLWB benefit, the annual withdrawal amount is assumed to be 95% of the annual maximum allowable withdrawal amount.

Mortality

The mortality assumption is based on an industry-standard mortality table, with future mortality improvement modelled using a standard age-based projection scale. The MHCI assumes a 50/50 split between male and female policyholders.

Projection period

The projection continues until the end of the mortality table.

Interest rates

MHCI calculations are based on end-of-month US swap interest rates.

Volatility assumption

For the volatility controlled fund, a volatility of 10% is assumed. For the asset allocation category, the underlying volatility assumption is based on the risk-adjusted Milliman Guaranteed Index® (MGI).

APPENDIX: METHODOLOGY CHANGES

Milliman conducts annual reviews of the product features and assumptions underlying the Milliman Hedge Cost Index and will implement updates to the assumptions as and when appropriate to keep pace with market trends and industry practice.

CHANGES EFFECTIVE MAY 2019

Product assumptions

- Most VA writers offer a bonus (or “roll up”) feature, in which a pre-defined bonus will be added to the benefit base if a policyholder waits to withdraw the lifetime income. The GLWB bonus rate has been increased to a 5.5% compound interest to be in line with recent trends observed in the market.
- The GLWB rider fee has been increased to 125 bps to reflect the small increase in bonus design and maintain consistency with the common charges in recent new product designs.
- To reflect the wide range of investment options offered by VA writers, we’ve added traditional asset allocation fund options to the existing volatility controlled fund option. The MHCI now models half of the investment options in the volatility controlled fund with target volatility of 10% and the other half in three traditional asset allocation classes, i.e., Aggressive, Moderate, and Conservative. The volatility assumption used for the traditional asset allocation category is the risk-adjusted MGI.

Modeling assumptions

- Companies’ lapse experience and assumptions have decreased in recent years. To reflect this trend, the MHCI base lapses within the surrender charge period have been reduced and the dynamic lapse factor for in-the-money policies has also been reduced.
- Both industry experience and company assumptions have shown that policyholders might not always take the full, maximum allowable withdrawal amount every year when they utilize the GLWB benefit. Accordingly, we have introduced a 5% withdrawal inefficiency adjustment to model the GLWB withdrawal amount.

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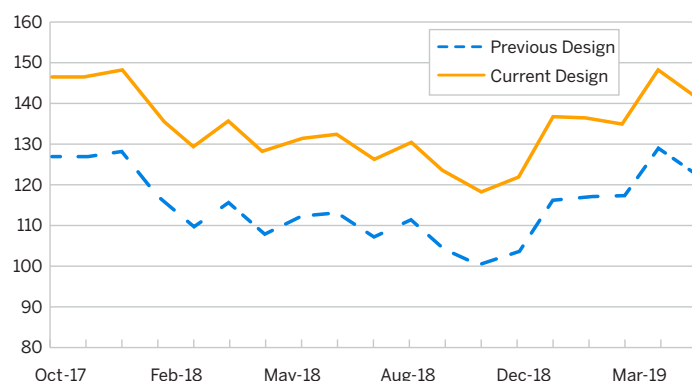
Impact analysis

The table and graph below provide historical monthly MHCI comparisons between the new and the current bases. In the period from 10/30/2017 to 4/29/2019, the difference in MHCI is around 20 bps. The monthly changes in the new MHCI are driven by movements in both the swap interest rate and the risk-adjusted MGI volatility, with interest rate being the predominant driver.

EXPECTED HEDGE COST
 (bps of Guaranteed Withdrawal Base)

	PREVIOUS DESIGN	CURRENT DESIGN	CHANGE FROM PREVIOUS DESIGN
10/30/2017	127	147	20
11/29/2017	127	147	20
12/28/2017	128	149	21
1/30/2018	116	136	20
2/27/2018	110	129	19
3/28/2018	115	136	21
4/27/2018	108	128	20
5/30/2018	112	132	20
6/28/2018	113	133	20
7/30/2018	107	126	19
8/30/2018	111	131	20
9/27/2018	104	123	19
10/30/2018	100	118	18
11/29/2018	103	122	19
12/28/2018	116	137	21
1/30/2019	117	137	20
2/27/2019	117	135	18
3/28/2019	129	149	20
4/29/2019	123	142	19

EXPECTED HEDGE COST (bps)



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