

Milliman Hedge Cost Index Methodology



PRODUCT SPECIFICATIONS AND MODELING ASSUMPTIONS

The Milliman Hedge Cost Index provides the estimated hedging cost for a hypothetical GMWB block based on the specifications and assumptions as further described below. The living benefit guarantee modeled is a lifetime guaranteed minimum withdrawal benefit (lifetime GMWB) rider offered on a variable annuity product. This benefit allows the customer to withdraw up to the lifetime guaranteed withdrawal amount (LGWA) every year as long as the person lives. The LGWA is 5% of the guaranteed withdrawal base (GWB). The LGWA may increase as a result of bonuses or resets to the GWB.

M&E Fee and Investment Expenses

The sum of mortality and expense (M&E) and investment fees varies by fund allocation type and is expressed as a percentage of the account value.

| FUND TYPE | M&E + INV FEE |
|--------------|---------------|
| AGGRESSIVE | 2.20% |
| GROWTH | 2.00% |
| MODERATE | 1.90% |
| CONSERVATIVE | 1.80% |

GMWB Rider Fee

The GMWB rider fee is 60 bps of the GWB.

Bonus

The GMWB product includes an annual simple interest 5% bonus. The bonus amount is calculated as 5% of the guaranteed bonus base (GWB), which can increase with resets to the GWB. The bonus benefit is available for up to 10 years while policyholders are not withdrawing.

Resets

The GMWB 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.

Withdrawal Rates

The annual maximum withdrawal rate is 5%. Policyholders cannot start the lifetime withdrawal before age 60.

Base Lapses

The following base lapse table is based on typical industry lapse assumptions for a six-year surrender charge product.

| DURATION | LAPSE RATE | DURATION | LAPSE RATE |
|----------|------------|----------|------------|
| 1 | 1% | 7 | 15% |
| 2 | 2% | 8 | 10% |
| 3 | 3% | 9 | 9% |
| 4 | 4% | 10 | 8% |
| 5 | 5% | 11+ | 7% |
| 6 | 6% | | |

Dynamic Lapses

The following table and graph illustrate the dynamic lapse factors used in the analysis. The dynamic function used is the standard exponential function. The dynamic lapse factors are multiplicative factors applied on the base lapse rates.

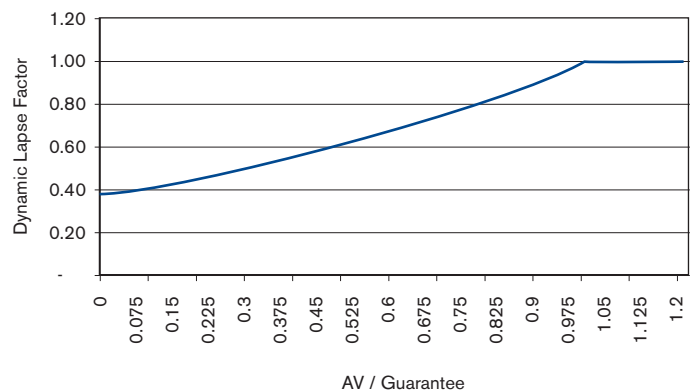
$$\text{Dynamic Lapse Factor} = \text{Min} \{ \text{Max} (e^{a \times (\text{ITM} - 1)}, 0.2), 1 \}$$

where $a = 1$, if $\text{ITM} \leq 1$, or $a = 0.3$ if $\text{ITM} > 1$,
and $\text{ITM} = \text{AV}/\text{Guarantee}$

$$\text{Adjusted Lapse Rates} = \text{Dynamic Lapse Factor} \times \text{Base Lapse Rates}$$

| AV/GUARANTEE | LAPSE FACTOR |
|--------------|--------------|
| 0% | 0.37 |
| 20% | 0.45 |
| 40% | 0.55 |
| 60% | 0.67 |
| 80% | 0.82 |
| ≥100% | 1.00 |

DYNAMIC LAPSE FACTORS



Mortality

The mortality assumption used is 85% of the Annuity 2000 Basic table. A blended table of 50%/50% male/female was used. Sample rates are shown in the following table.

| AGE | Qx |
|-----|---------|
| 60 | 0.00486 |
| 65 | 0.00765 |
| 70 | 0.01279 |
| 75 | 0.02169 |

Withdrawal Utilization

The following withdrawal cohorts were used:

| SINGLE AGE | DELAY | | | TOTAL |
|--------------|------------|------------|------------|-------------|
| | 0 | 5 | 10 | |
| 45 | 0% | 0% | 3%* | 3% |
| 50 | 0% | 0% | 5% | 5% |
| 55 | 0% | 10% | 5% | 15% |
| 60 | 5% | 12% | 3% | 20% |
| 65 | 6% | 13% | 3% | 22% |
| 70 | 8% | 11% | 1% | 20% |
| 75 | 6% | 4% | 0% | 10% |
| 80 | 5% | 0% | 0% | 5% |
| TOTAL | 30% | 50% | 20% | 100% |

Note: The single 45-year-old, 10-year delay cell waits 15 years before withdrawing (at age 60).

Off-risk Age

The projection continues until the policyholder reaches age 115.

Asset Allocation

The following table shows the index mapping for the asset allocation types used in the sample lifetime GMWB block:

| FUND TYPE | MONEY | | | | | | MARKET WEIGHT |
|--------------|-------|-------|------|-------|-------|---------------|---------------|
| | SPX | RTY | NDX | BA | MXEA | MARKET WEIGHT | |
| AGGRESSIVE | 35.0% | 12.5% | 7.5% | 20.0% | 20.0% | 5.0% | 10% |
| GROWTH | 30.0% | 10.0% | 5.0% | 35.0% | 15.0% | 5.0% | 60% |
| MODERATE | 25.0% | 5.0% | 5.0% | 50.0% | 10.0% | 5.0% | 20% |
| CONSERVATIVE | 20.0% | 2.5% | 2.5% | 65.0% | 5.0% | 5.0% | 10% |

Annual rebalancing was assumed in the valuation.

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Volatilities

The volatility assumption used was the risk-adjusted MG Index volatility. It was based on the 70 CTE methodology pegged to the one-year at-the-money implied volatilities. The bond index is not pegged to the one-year implied volatility.

In the calculations of the historical hedge costs, the same methodology described above was used for all periods, including those before when this methodology change was implemented.

Volatility for money market was assumed to be 1.0% for all durations.

Correlations

Correlations were based on the current month's MGIndex. Money market correlation was assumed to be 0 for all indices.

Interest Rates

End-of-month U.S. swap rates were used in the modeling. The July 30, 2009, swap rates and changes from prior month are provided below.

| TIME | SWAP RATE | CHANGE FROM PRIOR MONTH |
|------|-----------|-------------------------|
| 1 | 0.81% | -0.07% |
| 2 | 1.54% | 0.00% |
| 3 | 2.17% | 0.01% |
| 4 | 2.64% | 0.01% |
| 5 | 2.99% | 0.02% |
| 6 | 3.27% | 0.03% |
| 7 | 3.48% | 0.05% |
| 8 | 3.63% | 0.06% |
| 9 | 3.76% | 0.07% |
| 10 | 3.86% | 0.07% |
| 11 | 3.94% | 0.08% |
| 12 | 4.01% | 0.08% |
| 13 | 4.05% | 0.07% |
| 14 | 4.11% | 0.08% |
| 15 | 4.14% | 0.07% |
| 16 | 4.17% | 0.07% |
| 17 | 4.19% | 0.06% |
| 18 | 4.21% | 0.07% |
| 19 | 4.22% | 0.07% |
| 20 | 4.22% | 0.07% |
| 30 | 4.28% | 0.08% |