

Will GMWBs Keep-up with Retirees' Inflation?

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As the baby boomers contemplate their retirement longevity the Variable Annuity (VA) industry has shifted its guaranteed focus from dying to living. The new generation of VA riders is promising periodic income benefits and the most popular guaranteed living benefit is the so-called Guaranteed Minimum Withdrawal Benefit (GMWB). According to industry estimates more than 75% of VAs sold during 2005 included a GMWB rider, which is quite an unusual feat given that these riders barely existed a mere five years ago.

Boiled down to its essence, a GMWB is a pure money-back guarantee on an original premium deposit, or in the language of financial engineering it is a systematic withdrawal plan (SWiP) with a sequence of staggered put options. Under a GMWB the policy will continue to provide the guaranteed income flow regardless of the performance of the underlying sub-accounts and markets. This protection is especially important during the early years of retirement, where the portfolio is more vulnerable to the devastating impact of a bear market.

However, a critical concern with first-generation GMWBs is that regardless of whether they promise withdrawals of 5%, 6% or even 7% of the initial premium over 15 to 20 years, the static income flow is not designed to keep up with the consumer price index (CPI), and especially the inflation rate for retirees. A secondary concern is that even with GMWBs, retirees still face *longevity risk* once the guarantees have been exhausted and all the promised money has been returned.

Indeed, inflation for a typical retiree is quite different and likely higher than inflation rates for the general population. The U.S. Department of Labor has for many years

been tracking a unique inflation index for the elderly, called the CPI-E, which has consistently outperformed and outpaced the regular CPI. As an example, under the CPI-E calculation, medical care is nearly as important as food for retirees, but yet in the generic CPI food is four times more important (i.e. weighted) than medical care. Of course, medical care has experienced a much higher inflation rate than basic food during the last 10 to 20 years and the future is not likely to be much different. The bottom line is that regardless of the exact cost of living for retirees, true living benefits should be structured and designed to increase over time in a partial attempt to hedge these increasing expenditures.

Thus, perhaps in attempt to address the need for real versus nominal income, a number of VA manufacturers have introduced GMWBs that step-up the guaranteed base upon which the withdrawal benefits are computed, on contract anniversaries ranging from 1 to 5 years. The hope and expectation is that if the underlying account value – net of withdrawals – increases over time, the 5% withdrawal rate, for example, will be applied to a higher base and the income flow will trend upward over time. Some manufacturers have gone as far as guaranteeing this stepped-up income flow for life, as opposed to a fixed horizon, which provides the additional benefit of longevity insurance.

Notwithstanding the fact that an astute policy holder could create their own step-up by exchanging their VA policy for another policy with a GMWB – and they can always use some of their nest egg to purchase a payout annuity which creates longevity insurance -- this feature is a very important innovation. These second *generation GMWBs* explicitly encourage a growth oriented portfolio allocation while recognizing the need for an increasing nominal income stream that keeps up with the real threat of inflation.

And, although many of these step-up riders and the marketing material meant to support them are being positioned as “sure things”, it remains unclear to what

extent the income flow will actually step-up and thus keep-up with retirees' unique inflation rate.

To investigate this issue I conducted a series of Monte Carlo simulations that help shed some light on the odds. Boiled down to its essence, I generated thousands of different scenarios for the value of the underlying sub-accounts based on hypothetical asset allocations. I started the process with a single premium deposit of \$100,000 and in the first year a total of \$5,000 was withdrawn. In the second year another \$5,000 was withdrawn, and then finally in the third year another \$5,000 was withdrawn. Thus, if the hypothetical account value was above \$100,000, the guaranteed base was stepped-up to this higher value and the new withdrawal amounts became 5% of this stepped-up value. If the hypothetical account value was not greater than \$100,000 on the relevant date, the guaranteed base was not stepped-up. This process continued in 3 year increments until the very end of the longevity curve. (A similar exercise can be conducted for 1 and 5 year step-ups as well, although to save space I have not reported these results.)

The following Table #1 illustrates the results of this analysis for a portfolio that consists of 80% equity-based and 20% bond-based investments. The numbers are compared and can be benchmarked against the eroding power of a 3% inflation rate. Every three years the algorithm computed the median withdrawal amount as well as summary statistics for the range of possible outcomes. In addition to the median income flow, Table #1 also displays the 75th and 25th percentile which provide an inter quartile range of the possible outcomes.

Notice that at a 3% assumed rate of retiree inflation, the initial withdrawal or income flow of \$5,000 must grow to \$5,464 by year number 3 of retirement to keep up with inflation. And, by year number 12 the inflation-adjusted value of \$5,000 is \$7,129.

So, does the GMWB living benefit keep up? In the 80% equity and 20% bonds case the answer is yes, but barely. Although the median income does grow and steps-up over time, the 50% mark does not keep up with a 3% inflation rate. Even a second generation GMWB is not a substitute for an inflation-linked payout annuity.

Of course, a more optimistic spin on these results is that in one quarter of the scenarios the step-up performed even better than a 3% inflation rate. In these scenarios the real purchasing power of the income increased over time and the income flow was 30% higher in real terms by the 25th year. Either way, one is certainly justified in promoting a stepped-up GMWB as a rider that will increase the income flow over time and has a decent chance of keeping up with a 3% retiree inflation rate.

Table 1: GMWB income flow over time:
Investment Portfolio: 80% Equity / 20% Bonds

Year	3% Inflation Adjusted	75%	50%	25%
		Chance of having more than...		
0	\$5,000	\$5,000	\$5,000	\$5,000
3	\$5,464	\$5,000	\$5,130	\$6,284
6	\$5,970	\$5,000	\$5,769	\$7,252
9	\$6,524	\$5,000	\$6,188	\$8,106
12	\$7,129	\$5,000	\$6,515	\$8,934
15	\$7,790	\$5,210	\$6,803	\$9,942
18	\$8,512	\$5,440	\$7,336	\$10,884
21	\$9,301	\$5,739	\$7,870	\$11,776
24	\$10,164	\$5,963	\$8,501	\$13,408

Now, for those readers who are more technically inclined and would like to replicate the results themselves, the scenarios within Table #1 were simulated under the assumption that gross returns will be 9% and net returns (after all insurance and management fees) will be 7% on average in any given year, with a volatility (a.k.a. uncertainty) of 16%. Returns and withdrawals were computed --

and portfolios were rebalanced -- monthly, with the continuously compounded returns generated by a standard Normal distribution.

To contrast the analysis under the moderately aggressive 80% equity and 20% bond portfolio, I also generated scenarios and results for a 100% equity portfolio. These numbers are displayed in Table #2 using the same tabular format.

Once again the initial premium of \$100,000 is subjected to \$5,000 withdrawals per year during the first three years after which the guarantee steps up if the account value is greater than its value 3 years ago. This cyclical process continues for the life of the policyholder, or at the very least until the entire guaranteed amount has been returned to the policyholder.

Table 2: GMWB income flow over time:
Investment Portfolio: 100% Equity

Year	3% Inflation Adjusted	75%	50%	25%
		Chance of having more than...		
0	\$5,000	\$5,000	\$5,000	\$5,000
3	\$5,464	\$5,000	\$5,159	\$6,558
6	\$5,970	\$5,000	\$5,899	\$7,874
9	\$6,524	\$5,000	\$6,489	\$9,167
12	\$7,129	\$5,079	\$7,190	\$10,806
15	\$7,790	\$5,392	\$7,751	\$12,457
18	\$8,512	\$5,740	\$8,577	\$13,797
21	\$9,301	\$6,108	\$9,706	\$15,752
24	\$10,164	\$6,687	\$10,897	\$18,630

Notice that in Table #2 under a 100% equity portfolio the median income flow does, in fact, keep up with a 3% retiree inflation rate. For example, in withdrawal year number 12, where the inflation-adjusted value of the \$5,000 income is now \$7,129, the median income flow is projected to be \$7,190 per year. In fact, even in the worst 25% of scenarios income does start to increase by year number 12.

And, once again, for the quants amongst the readership, the inputs to Table #2 differ from Table #1 by assuming a more aggressive 8% (instead of 7%) net expected return with a volatility of 20% (instead of 16%). Notice, implicitly the impact of fees on the probability of a step-up. Obviously, the higher the management and insurance fees, the lower the investment returns and the lower the probability of a step-up.

From a broader perspective, some important lessons emerge from this kind of analysis regardless of whether you agree with the exact parameter values. Although the retiree can certainly expect to receive a step-up and the median income flow does increase over time, there is at least a 25% chance that the policy holder will experience no step-ups during the first 10-12 years of the policy. And, these estimates are based on relatively generous nominal portfolio returns of 7%-8% per year, after all fees. If you are more skeptical about the equity premium, the probability of no step-up is even higher. One must therefore make sure this possibility is clear to anyone who is expecting – but not guaranteed – a step up.

More importantly, for the step-up feature to actually keep up with retiree inflation, the underlying portfolio must be invested in a relatively aggressive manner. Notice how the middle column in Table #1 lagged the 3% inflation rate, while the equivalent results in Table #2 just managed to keep up with this benchmark. Once again, a substantial equity exposure is critical. Yet, I suspect that no GMWBs on the market today allow for an underlying portfolio that is 100% equity (and perhaps rightfully so given the cost of hedging such a guarantee.)

In sum, for a GMWB rider to properly deliver on its promise, I believe it must provide some form of benefit increase (a.k.a. step-up) to keep up with the cost of living. Second, it must contain some form of longevity insurance by extending the maturity horizon to life. Finally, the underlying portfolio must be linked to a growth-oriented allocation for a step-up option to become a stepped-up reality.

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