MILLIMAN WHITE PAPER

Milliman VALUES™ 2020 GLWB industry lapse study

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In 2014, Milliman's Life and Annuity Predictive Analytics team kicked off a series of variable annuity (VA) policyholder behavior experience studies using predictive analytics, starting with an industry lapse study. The goal of our Milliman VALUES™ series is to evaluate and improve common assumptions using advanced analytics, and to provide implementable suggestions.

Our 2020 Milliman VALUES Guaranteed Lifetime Withdrawal Benefit (GLWB) industry lapse and utilization studies include 3.2 million policyholders from eight large VA writers, representing roughly $380 billion of initial account value and covering a range of GLWB product designs as well as demographic attributes. Our experience spanned from 2007 through the second quarter of 2020. With this lapse study, we significantly increased the amount of exposure in late durations, allowing us to better calibrate behavior out of the surrender charge period.

2020 lapse study takeaways

These are some of the insights from our 2019 GLWB industry lapse study. Figures in this section are based on the industry data supporting the lapse study and are stylized to convey relative likelihoods of lapse for the sake of comparison. Individual company experience will differ based on the demographic composition and product features in its block.

The 10-year treasury rate at the time of observation, a proxy for a policyholder's discount factor, drives lapse rates after the end of the surrender charge period. After controlling for long-term lapse trends from other sources, we found that higher treasury rates are associated with greater lapse rates. A predictive model suggests that for every 100 bps of treasury rate growth, post-surrender-charge-period lapse rates increase by a factor of about 1.15. Of course, it is impossible to know if that trend stays constant in a rising interest rate environment. Perhaps unsurprisingly, treasury rates show little effect on lapse in the surrender charge period.

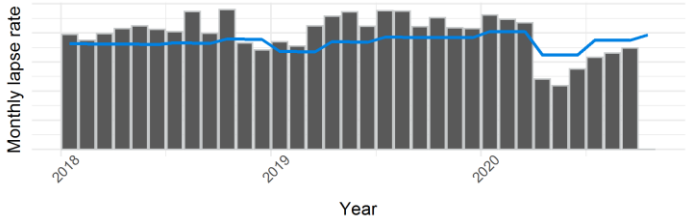
Present value-based definitions of moneyness are less predictive, largely because of how age and longevity drive lapse. It seems one of the key downfalls of a present value-based approach to moneyness is the inverted lapse relationship to attained age (and thus to longevity). In the present value calculation, moneyness decreases as the number of expected remaining withdrawals decreases. Thus, the assumption is that as policyholders age, they should become more likely to lapse. However, policyholder sensitivity to their age is actually the opposite: As policyholders age they tend to lapse *less* often.

There are potentially good reasons for this. For one, many of these policyholders may have a death benefit that is relatively more valuable than the withdrawal benefit, and they are appropriately valuing that. Additionally, relatively younger policyholders—those in the their 50s and 60s—may have more liquidity needs such as paying off houses, their children's college tuitions, or even their children's houses. By one's 70s, they have fewer major expenses, and they now have access to Medicare for a large proportion of health-related costs.

Policyholders sold through independent agents lapse more often than those sold through captive agents, especially when they were compensated with a fully upfront commission. Using a predictive modeling technique called regularization, we were able to more credibly model the interaction effects between distribution channel and commission structure, as well as policyholders' moneyness sensitivity based on combinations of the two. Policyholders sold through independent agents are also more sensitive to changes in the moneyness of their withdrawal benefit.

The COVID-19 pandemic has reduced lapse rates well beyond what a typical moneyness-based assumption would expect. Figure 1 shows actual monthly lapse rates (gray bars) along with a predictive model lapse assumption (blue line) from between 2018 and the third quarter of 2020. As of September of this past year, lapse rates were still sitting below expectations.

FIGURE 1: ACTUAL AND EXPECTED LAPSE RATES BY QUARTER



Future plans

Building off our variable annuity studies, we are currently researching a number of distinct items, including:

- Investigate third-party data as drivers of policyholder behavior. We expand on this in the following section.
- Compare our industry variable annuity experience and policyholder behavior models to the assumptions prescribed in VM-21.
- Further investigate the effects of macroeconomic factors and the COVID-19 pandemic on variable annuity lapse behavior (beyond dynamic moneyness factors).

We have also begun a large study on indexed annuity policyholder behavior study, using both company in-force data as well as third-party variables to better understand lapse and withdrawal behavior. Please contact our team if you're interested in participating.

Our goals

This study builds on the effort we began in 2014 to provide insights into policyholder behavior based on scientifically sound principles. The report contains a comprehensive analysis of all the drivers we studied related to GLWB lapse behavior, and for each driver the report provides more details, including charts, tables, etc. It also provides both a baseline predictive lapse model function, with typical industry drivers, as well as details about investigatory lapse models with more drivers. In this iteration of the study, our investigatory models included such drivers as past utilization behavior, age, gender, distribution channel, commission structure, policy size, and macroeconomic drivers of lapse. The baseline lapse model is designed for straightforward implementation in an actuarial projection.

We go beyond the report, however, giving subscribers access to Recon® GLWB, an interactive, web-based platform that allows them to visualize and download both the data and predictions from both models in an effective way. Subscribers also have access to the coefficients and model form of our linear predictive models. Recon GLWB is updated each quarter as participants send in updated experience data. Each year, we fully refresh the platform with updated models and new insights based on the VALUES studies.

Our goal is to continue to expand the insights we provide via the VALUES studies on the Recon platform to help our clients.

In that vein, we plan to use third-party data to better segment policyholders, providing a clearer picture of what drives policyholder behavior. Recon subscribers will be able to see data snapshots across these refined policyholder segmentation groups, and subscribers will also have access to predictive models driven by the third-party data policyholder segments.

More generally, we help subscribers by:

- Closely monitoring the emerging industry experience
- Using industry data to benchmark company experience against the industry and supplement assumption setting, particularly where a company's own experience is scarce
- Allowing companies with no GLWB products to get a view on policyholder behavior as they contemplate market entry
- Support in-force management and product development strategies

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For more information on the purchase of the full 2020 GLWB utilization or lapse reports, including access to Recon® GLWB, and to participate in our ongoing industry experience studies, please contact:

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