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Variable Annuity Mortality Reinsurance

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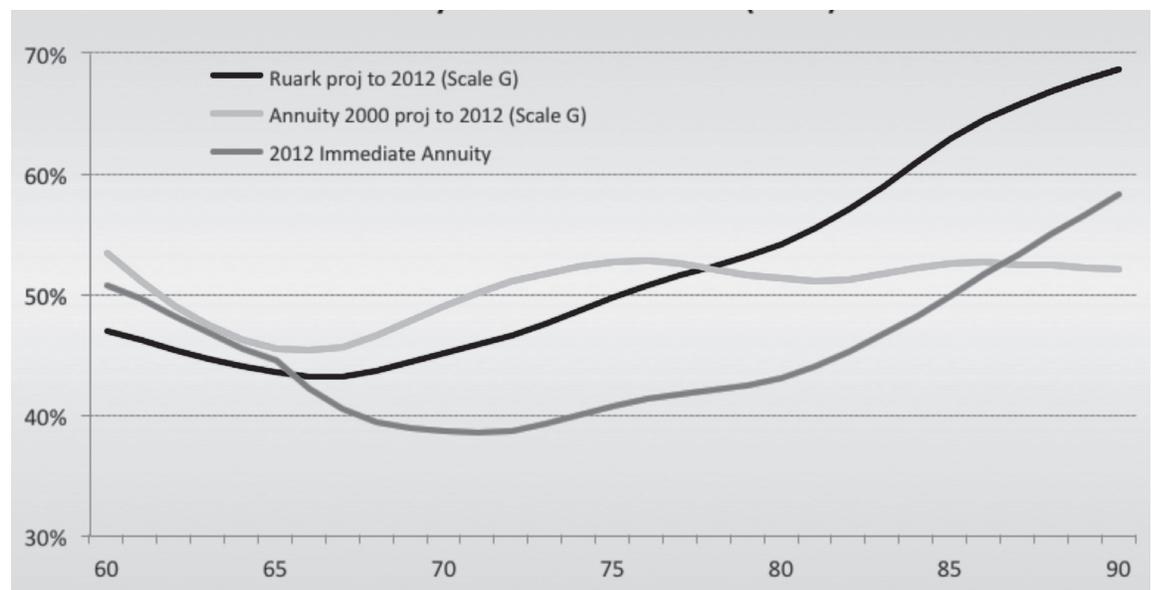
One of the primary objectives of variable annuity companies is to grow and protect their asset-based revenue stream. The provision of popular complex guarantee features to policyholders poses a major challenge to this objective, as is evident from the dramatic changes in market leadership and even market participation for many companies over the last few years. While variable annuity companies have implemented sophisticated hedging programs in an effort to mitigate the investment risks associated with these guarantees, the variability of policyholder mortality and behavior results in a moving target for hedging programs and exposes companies to losses that can overwhelm the asset-based revenues. Fortunately, this risk can be mitigated with appropriately structured reinsurance that complements the hedging program.

In order to use this type of reinsurance effectively, an accurate understanding of the level, shape, and variations of variable annuity mortality is vital. However,

based on experience over the last decade, standard annuity mortality tables often fail to capture the dynamics of variable annuity mortality. To fill this void, the Ruark Mortality Table was developed, based on an industry experience study of 13 variable annuity companies with 2.5 million exposure years and 49,000 reported deaths. The following graph illustrates how the Ruark Mortality Table differs from some standard annuity mortality tables for selected male ages.

Regardless of the mortality table used, modifiers are often necessary to reflect important variations such as product type and policy size. For example, relative to the Ruark Mortality Table, mortality can vary as much as 20 percent depending on the type of guarantee features on the policy; rich death benefits tend to invite higher mortality, and rich living benefits tend to invite lower mortality, both of which suggest a selection effect on the part of the variable annuity buyer and their financial . Moreover, these effects are magnified as much as 20 percent for larger policies.

Mortality as % of 1994 MGDB (Male)



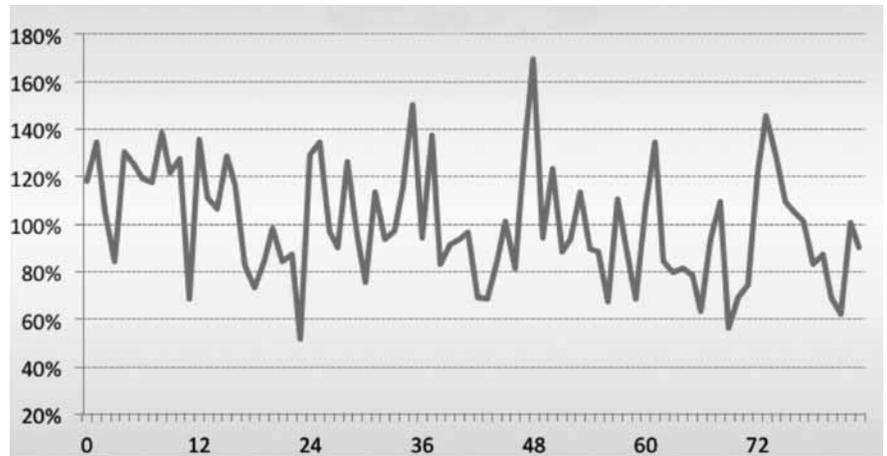
With a clear understanding of the appropriate mortality basis, including any modifiers for specific product types and cohorts, a reinsurance program can be developed to mitigate the mortality risk. Let's consider an example. The following graph illustrates 84 months of mortality results for a representative variable annuity block.

Results are shown as a percentage of the Ruark Mortality Table; 100 percent of the Ruark Mortality Table corresponds to the aggregate results of the industry experience study. The monthly results shown range from a low of 51 percent to a high of 169 percent, with an average of 100 percent.

A variable annuity company attempting to hedge the death benefit guarantee would typically purchase a portfolio of financial derivatives intended to fund the guarantees based on an assumed average mortality level, such as 100 percent of the table. However, from month to month, there would be wide fluctuations between the expected payments at 100 percent of the table and the actual payments that range from 51 to 169 percent, representing either hedging or unhedgeable insurance losses. The financial impact of this mismatch would vary depending on the composition of the block, but can be as much as \$5 million in a single month for a \$10 billion variable annuity block. This is undesirable financial noise relative to the asset-based revenue stream, warranting executives' attention and explanation.

How can this mortality noise be quieted? Quite simply—with a mortality swap. This is a modern name for a classic mortality reinsurance structure often used for life insurance: the reinsurer pays the net amount at risk on death claims in exchange for a series of reinsurance premiums equal to the net amount at risk times a tabular mortality rate. An appropriate choice of mortality table, such as the Ruark Mortality Table in the example above, will mitigate noise between the premium basis and the actual death claims.

Monthly Mortality
(% of Ruark Mortality Table)



Other structural considerations are also important, such as the length of the reinsurance term, the extent to which the premium basis is guaranteed for the term, and the quota share. While specifics may vary, this type of reinsurance is generally available for terms as long as 10 years on a fully guaranteed premium basis with high quota shares.

With the variable annuity company's tabular mortality locked-in during the reinsurance term, its hedging program would be recalibrated to fund the guarantees based on mortality equal to the reinsurance premiums. This simple and ready solution would allow the hedging program to operate effectively without risk of mismatch due to mortality fluctuations, which would help the variable annuity company protect its asset-based revenue stream. ■