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# Handling LTC Misestimation Risks

by Bruce A. Stahl

One of the dangers in any sort of modeling, whether for insurance experience or in financial portfolios, is becoming too reliant upon statistics and models, and not keeping reasoned, experienced judgment in sight. This was clearly seen in 2008's financial meltdown, where overreliance on Value at Risk (VaR) modeling—a modeling convention designed to measure short-term risks to 99-percent confidence levels—lulled many financial firms to sleep with a false sense of security. These firms ignored the dangers of events within the remaining 1-percent likelihood of occurring, and they failed to monitor the continuing relevancy of some assumptions in the models.

Just as VaR lulled many financial firms to overconfidence, modeling conventions of long-term care (LTC) insurance risks could also exert a similar lulling effect on LTC insurers. LTC insurance professionals need to consider whether the model assumptions that feed the model distributions are realistic and remain realistic. Insurance professionals may misinterpret the experience of past LTC insurance risk behavior, and future behavior may not agree with the past. If either occurs without being recognized in pricing, the pricing assumptions may be misestimated.

When data is sufficient to identify statistical distributions for the experience, LTC insurance experience will face random fluctuations from period to period. In an ideal world, LTC insurers would have enough data to perform good simulations to calculate statistical confidences. Although normally LTC professionals do not have enough yet because the industry is so young (in its modern form, just 25 years), the LTC professionals still think in terms of statistical confidence levels.

For example, when performing rate stability certifications, the pricing actuary will state with some level of personal (though not necessarily statistical) confidence that premium rates will not need to be increased. That particular level of confidence is described as sufficient for “moderately adverse” experience. In statistical terms, that particular level



of confidence is greater than 50 percent and probably smaller than 99 percent. So despite the lack of statistical modeling and measurement, the pricing actuary has some confidence that no rate increase will be needed over the lifetime of the policy.

Still, actuarial confidence in LTC insurance projections is not so great that LTC policies can be issued with lifetime rate guarantees. LTC insurance professionals must consider the risk of misestimation, and the adverse possibilities that could emerge. Most LTC insurance policies cannot be canceled by the insurance company. If adverse experience develops, however (e.g., if morbidity is higher than assumed), the insurer can implement rate increases for the entire class of policies. This ability is necessary should morbidity rise so high that the insurer's capital would not be able to support it.

Four ways exist to address adverse experience possibilities resulting from misestimation risk: through increasing premium rates; through Provisions for Adverse Deviation (PAD) in the reserves; through the level of capital; or through reinsurance. (The limited payment options available on many LTC policies suggest that at least some actuaries are highly confident that a particular premium level will be sufficient for adverse risks, but presumably these premiums are at a level that would cover much



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CONTINUED ON PAGE 10

more than “moderately adverse” experience, and, hopefully, would cover many more extreme adverse experience scenarios.)

Many causes of morbidity misestimation are easy to discern and address. For example, LTC insurers speak of the male/female mix as a distribution risk. This means that as men are expected to incur fewer claim dollars than women, insurers watch to make sure they do not issue more policies to women than they anticipated when pricing. There is also a regional distribution risk, but that can be addressed in pricing so as to minimize the need to watch geographic distribution. For example, an insurer may note that home health care claims occur more frequently in Florida than they do in other parts of the country. Such an insurer might decide to set premium rates higher in Florida than in other states which would render the distribution risk lower than it would be if an average premium rate were to be used for all states.

Some causes of morbidity misestimation, however, take time to recognize. As LTC is a relatively recent product, its pricing has suffered from lack of substantial historical insured experience. This has been alleviated to some degree by the large number of LTC insurance benefits that have now been paid. However, experience samples remain small compared to other more mature insurance lines, which means future LTC claims experience still runs a greater risk of being misestimated. As the number of data samples increase, lifetime experience should be better estimated and period-to-period performance differences should appear random.

Also, some LTC actuaries may interpret past experience differently from others. A study could show, for example, that the incidence rate for larger lifetime maximums is lower than that for smaller lifetime maximums. Some actuaries could conclude from such a study that the underwriting was stronger for higher benefit levels. Others might decide that the difference could be attributed to lower issue ages for the larger lifetime maximums. Drawing one of these conclusions or any number of other possible conclusions will likely affect the projection modeling.

Even if past experience is interpreted sufficiently well, future morbidity may not be estimated correctly. The misestimation error could be both on the adverse and favorable sides of the line. For

example, the article “NeuroAIDS: An Evolving Epidemic,” published in the May 2009 edition of *The Canadian Journal of Neurological Sciences*, recognized a very favorable response of cognitively impaired HIV-infected individuals to antiretroviral drug therapy. Yet the same paper expressed a concern for adverse hypertension and diabetes effects of continued antiretroviral drug therapy as patients age. Undoubtedly research continues to develop therapies that overcome adverse effects of various illnesses and the drugs that treat them (and perhaps use them in other areas of medical therapy). Still, LTC professionals must prepare for adverse effects as well as recognize favorable progress to date.

As mentioned earlier, highly adverse misestimation can be alleviated through rate increases. Moderately adverse misestimation, however, must be addressed otherwise, perhaps through reserve PAD, through supporting capital, or through reinsurance. PAD to some extent, protects LTC insurers from moderately adverse experience. Yet there may be a gap between the point where an insurer might be willing to implement a rate increase and the maximum point that PAD would address. For example, perhaps the originally projected lifetime loss ratio was 55 percent using a specified interest rate, while the insurance company would only implement a rate increase if a later revised projected lifetime loss ratio exceeded 66 percent using the same interest rate. PAD might address only the first six percentage points of the 11 percent difference, which would mean the remaining five percentage points would have to be addressed by capital or through reinsurance. (For this article, that remaining 5 percent is called a corridor.)

Although a reinsurance contract to cover the 5-percent corridor might not receive reserve credit for statutory purposes, it could help alleviate the strain on an LTC insurer’s economic capital. In the hypothetical example above, the LTC insurance company might be willing to pay 1 percent or 2 percent of its premium each year for a reinsurer to assume the risk for that 5 percent corridor, rather than holding 5 percent of the present value of future premiums in capital to support the risk.

The corridor could be reached due to risks other than morbidity misestimation, but the historical problem of overestimating mortality and lapses is remote because pricing today often recognizes such small decrements that adverse scenarios do not nor-

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mally generate severe enough shifts in the loss ratio. Putting aside asset and reinvestment risks (because this example bases the loss ratio on an assumed interest rate), morbidity misestimation is the most likely source for an adverse lifetime loss ratio.

Morbidity for LTC insurance is composed of incidence rates, continuance assumptions (or claim terminations) and utilization (or paid percentages relative to the daily maximum). For LTC, these assumptions often lack the degree of credibility enjoyed by other more mature insurance products. They are also the likely source for experience causing the corridor to be entered, and the source of the possibility that adverse experience extending into the corridor may not be discerned for the life of the policies, both as active lives and as disabled lives. Therefore this corridor reinsurance needs to be in place for a very long time.

Given the long horizon, perhaps a corridor reinsurance provision is best addressed by coinsuring a portion of the overall risk as well. The reinsurer will thereby have access to how the business is being administered and how the experience is developing.

The corridor reinsurance can then have a periodic accounting where newly projected experience can be used as a basis for corridor experience adjustments through the life of the policies.

Policies with limited payment options will not have a predefined corridor. In such cases, a corridor can be created if the insurer sees the moderately adverse experience as being more pernicious than the possibility of highly adverse experience. This would be possible when the combination of the perceived likelihood for experience in the corridor and the magnitude of corridor losses are greater than the combination of the perceived likelihood of adverse experience and the magnitude of adverse losses. Clearly, the decision depends upon the perceived likelihood of various loss scenarios.

The industry may not face adverse losses due to misestimation of assumptions in the future. Yet the risk exists, and LTC insurers will do well to consider how best to prepare for the possibility. ■

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