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LTCI Experience Analysis Using Modified Natural Reserves

by William C. Weller

The 2000 NAIC LTCI Model Regulation establishes a new basis for developing premium rates (see Section 10 of the Model), coordinating rating assumptions with reserve assumptions (see 10.B.(2)(d)) and in the event of a rate increase request, the ability to document differences in actual and assumed experience (see 20.B.(3)(c) of the Model).

This paper notes that typical conservatism in valuation reserves may not provide the best framework to accumulate margins for moderately adverse experience or to analyze experience as it develops. The use of natural reserves, based on best estimate assumptions and separate margin accumulation, may provide a better approach. This approach may also be useful in meeting the requirement to compare gross premiums to net valuation premiums for renewal years.

Problems with Using Valuation Reserves

Valuation reserves are based on a set of assumptions that are to include margins equal to or greater than those in pricing. These margins are created by using an interest rate lower than pricing, assuming lower lapse/mortality rates and/or higher morbidity costs. This set of assumptions will determine a set of valuation net premiums—one for the first year and another for all renewal years if the generally accepted reserve method is used. The reserve is then determined prospectively applying the assumptions and net premiums to future periods. As these future periods become current and then past years, the margins are no longer contained in the calculations. This release will not generally be timed to match the release of the risk of premium increases.

Modified Natural Reserves

"Modified" means that the reserve is zilmerized by allowing the first year gross premium to reflect first year claim costs and margins with the balance going to offset first year expenses (both acquisition and administrative expenses). The gross premium for renewal years is split into four parts:

$$GP = P^{bB} + P^{bM} + P^{bE} + P^{bR}$$

where:

P^{b}	means that the assumptions are "best estimate,"
P^{bB}	is the level premium for benefits excluding the first year,
P^{bM}	is the level premium for margins excluding the first year,
P^{bE}	is the level premium for renewal expenses, and
P^{bR}	is the level premium to cover risk and return of acquisition costs not included in the portion of the first year premium for these costs.

We will assume that the last two do not create a reserve while the first two clearly do.

The reserve created by the first, while calculated on a prospective basis, can also be determined by the formula:

$[(V^{bB})_{t\ 1} \text{ X } (1+i)] \text{ X } (p_t + w_t) + [P^{bB} \quad CC_t] \text{ X } (1+i)^{1/2} \text{ X } p_t = (V^{bB})_t \text{ X } p_t$

The reserve created by the second can be determined by the formula:

$[(V^{bM})_{t\ 1} \text{ X } (1+i)] \text{ X } (p_t + w_t) + [P^{bM}\ ] \text{ X } (1+i)^{1/2} \text{ X } p_t = (V^{bM})_t \text{ X } p_t$

All values are based on best estimate assumptions used in pricing. $(V^{bB})_t$ will increase then decrease to zero as CCt increases. As wt increases towards 1, $(V^{bB})_t$ approaches infinity and becomes inappropriate. It seems to the writer that the relationship of $(V^{bM})_t$ to the highest value of $(V^{bB})_t$ should be applied to all later years, possibly with some small additional conservatism.

Note that the sum of $(V^{bB})_t$ and $(V^{bM})_t$ (with the adjustment for the limitation recommended) can be compared to the valuation reserve used by the appointed actuary which includes implied or specific margins in the reserve assumptions.

The sum of the above reserves, based on best estimates, can be directly compared to a fund development of actual experience on a source of differences basis. The fund would be determined by the formula:

$[\mathbf{(F^a)}_{t\ 1} \text{ X } (1+\mathbf{i}_t)] \text{ X } (1 + \mathbf{w}_t) + [\text{GP} \quad P^{bE} \quad P^{bR} \quad \mathbf{IC}_t] \text{ X } (1+\mathbf{i}_t)^{1/2} \text{ X } \mathbf{p}_t = \mathbf{(F^a)}_t \text{ X } \mathbf{p}_t$

where $\mathbf{IC}_t$ is incurred claims

Bold values are actual experience. The assumed portions of the gross premium for expenses and risk/return in the original pricing are not adjusted in this formula. It is possible that a company may wish to reflect differences in these values in the "fund" as well as the more normal interest, persistency and benefits.

Experience Analysis

The experience analysis can look at the results for each year or focus on the cumulative results of the following segments of developing experience. While the formulas above are written in policy year terms, it may be best to adjust them to calendar year values. This reduces the time needed for experience periods to close.

Interest – comparing the above formulas using the values which contain the "i" and the **"$\mathbf{i}_t$"** will show the yearly effect of interest margin or adverse experience:

$[\mathbf{(F^a)t\ \ 1} \text{ X } \mathbf{i}_t] \text{ X } (\mathbf{p}_t + \mathbf{w}_t) + [\text{GP} \quad \text{PbE} \quad \text{PbR} \quad \mathbf{IC}_t] \text{ X } (\mathbf{i}_t)^{1/2} \text{ X } \mathbf{p}_t$ less the sum of

$[(V^{bB})_{t-1} \text{ X } i] \text{ X } (p_t + w_t) + [P^{bB} \quad CC_t] \text{ X } (i)^{1/2} \text{ X } p_t$ and
$[(V^{bM})_{t-1} \text{ X } i] \text{ X } (p_t + w_t) + [P^{bB}\ ] \text{ X } (i)^{1/2} \text{ X } p_t$

Persistency – comparing the above formulas for reserves released by terminations will show the yearly effects. Comparing the end-of-year fund and reserves will show the adequacy of the values for the persisting population. If yearly amounts of reserves released are inadequate, it probably means that new assumptions for future, higher persistency should be considered.

$[\mathbf{(Fa)}_{t-1} \text{ X } (1+\mathbf{i}_t)] \text{ X } w_t$ less the sum of
$[(V^{bB})_{t-1} \text{ X } (1+i)] \text{ X } w_t + [(V^{bM})_{t\ 1} \text{ X } (1+i)] \text{ X } w_t$

Benefits – comparing the above formulas for benefit values:

$\{\mathbf{IC}_t \text{ X } (1+\mathbf{i}_t)^{1/2}\}$less than $\{CC_t \text{ X } (1+i)^{1/2}\}$

The analysis of these component results can be used to address any deficiencies in the operations at the earliest time. Addressing them early should allow future margins to be maintained without the need for rate increases.

Adequacy of Margins – Since actual results will not equal best estimate assumptions in each year even if the cumulative results are consistent, it is also good to analyze the cumulative differences using the three formulas above with the cumulative margin reserve $(V^{bM})_t$. In addition, the impact of a continuation of past experience into the future on the developing values of reserve components and fund components would seem to be an appropriate way to prepare for the potential filing of a rate increase request.

Excess Margins – It is likely under the new pricing approach required by the 2000 NAIC Model, that some policy forms will have continuing favorable experience—i.e. better than best estimate. Should

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It was in response to concerns that as society is changing, financial security systems and programs do not always respond rapidly to them.

Simplification, Privacy of Health Information and Data Security.

COMPLIANCE TRACK: by Kathy Hamby

Using a variety of presentation styles, the compliance track provided practical approaches to the processes that long term care insurance laws and regulations dictate. The track called on professionals from compliance, law, sales, actuarial, and marketing to share their expertise, either as a regulator or an industry representative. Weaving the thread of compliance through the fabric of long term care insurance, these professionals gave relevant information on topics as varied as advertising review, suitable sales and market conduct examinations. The track also took a look at new marketing approaches, as well as how law and regulations develop and the need for both industry and regulators to be proactive. Finally, compliance 101 addressed the basics for those new to long term care insurance.

MANAGEMENT TRACK: by Peter Goldstein

The goal of the management track was to introduce attendees to a variety of topics involving management of the LTC business. Several sessions focused on building and managing this business including mergers and acquisitions, growing profitably and a management 101 basics course. The presenters were all industry leaders and senior executives of long term care companies. The management track also examined consumer protection and how it has evolved with the product. International long-term care and the federal program were also discussed in detail. Lastly, a unique "talk show" format took a look at "What Went Wrong!" Executives from three companies discussed in rare candor strategies that failed, and why.

MARKETING TRACK: by Claude Thau

The Marketing Track hosted 11 sessions covering a wide array of topics. The speakers, who covered a broad spectrum of viewpoints, included experts from insurers, field marketing, consultants, TPAs, service providers and regulators. Pre-conference preparations, such as conducting an agent survey and collecting LTCI materials that encourage generational discussions about LTC, enhanced several of the sessions. Each presentation is available on the SOA Web site and should prove interesting to both those from within and outside of the Marketing Track.

UNDERWRITING TRACK: by Maureen Lillis

The underwriting track provided up-to-date information on risk management practices that can be applied to daily processing. Yet, the underwriter remains challenged to protect the risk pool as the result of recent changes in product design, advances in medical research and the expansion to multiple rating classes. This is further complicated by the need to provide the agent with the necessary tools to complete appropriate field underwriting. The sessions were designed to provide both education and interaction from participants. The quality of the speakers included industry experts knowledgeable on topics such as product administration, marketing strategies, psychiatric impact, group processing and the prevalence of cognitive conditions in the management of long-term care.

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the Fund retain these excess margins? Should they be allowed to be reported as profit (over and above the profit portion of PbR)? Should a portion (or all) be retained to offset the need for rate increases on other policy forms? If so, for how long?

Release of Expected Margins or Retained Excess Margins – As noted in the first analysis of (VbM)t it is suggested that this reserve be capped as a percentage of $(V^{bB})_t$. When the reserve is so capped, the same questions about excess margins must be addressed. In addition, since the capping suggests that the future risk is limited, should there be a termination dividend?

This paper suggests a method to analyze developing experience of LTCI policy forms. The approach seems consistent with the desire to establish margins for moderately adverse experience and to relate original assumptions with actual experience when requesting a rate increase. It also notes a number of areas where additional questions are raised. The answers are most likely to be different depending upon the assumptions with regards to the sources and use of margins in the pricing work of the actuary (see the Academy of Actuaries draft practice note Section III.1.).

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