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Is It Really All In The Math?

By Robert Stone

It's probably fair to say that many actuaries are in the profession because somewhere along the academic path they proved themselves accomplished in mathematics, or they liked mathematics, or both. Or maybe they grew up in an era when a certain national magazine routinely touted actuarial science as one of the top professions? Regardless, mathematics for actuaries is a passion and a core competency, which successful completion of the actuarial exams alone demonstrates over and over.

Traits that are inherent in mathematical ability include problem-solving, appreciation for logic, and an ability to engage in abstract thinking. Again, these are tremendous gifts, leading directly to excellence in computer programming, robust spreadsheet analyses and creation of custom tools for as-needed calculations.

With all these positives, is there a time when mathematics can be a negative?

This is mostly a rhetorical question, not necessarily one to be answered here. But it does raise a few thoughts that are worth pursuing for a moment.

Actuaries have a unique ability to solve problems, which can lead to amazing product advances. Universal life, indexed annuities, and living benefit guarantees provide examples of past product innovations that have expanded insurance offerings and addressed safety and security concerns of customers.

The same ability, however, can be used to create solutions that are not as positive. It happens when product development becomes strictly a math problem, looking too narrowly at the question of how to make a certain set of mechanics work under a certain set of profit constraints.

Finding answers to such questions can be a great challenge, of course. It may be that reaching a positive outcome may be a greater challenge still. Any downside that lurks inside a mathematical solution can often take several unanticipated forms.

Sometimes the downside is tame and easily foreseen—perhaps a little more distribution risk than a prior product generation.

Other times the negatives may be more hidden, taking the form of low emerging earnings in later durations that were not immediately apparent in a front-loaded internal rate of return.

Still others could take the form of more embedded risk than before, either not easily seen in a base deterministic run or masked unintentionally by new charges or assumptions.

Rarely are such things done with the intention of harm. Actuaries are merely solving the problems as set before them.

Fortunately, actuaries are also accustomed to showing a range of profit targets, which provide multiple views of their results. Deterministic and stochastic scenario testing of results also provides additional insight and color around profit results.



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More important still is acknowledging that the business of life insurance is complicated. Companies take risks and make conscious business decisions every day leading to results that drift into gray areas instead of the distinctly differentiated black and white we would all prefer to deal with, and that the logical world of math may seem to promise us.

Even with the proper context, it is worth keeping in mind that the ability to work the math is only one part of truly solving the problem. A healthy dose of “Does this make sense?” when looking at the answer to the math problem goes a long way toward turning that answer into a solution.

Companies will continue to run into business needs that require the skills of their product actuaries: competing with another company’s rates, adding a new feature to an existing product, increasing customer value at the same price, and more.

It adds up to a conundrum that actuaries are quite able to take on.

Price-oriented protection products like guaranteed level term and universal life with secondary guarantees may undergo changes. With fewer cost-effective means to reduce the surplus strain associated with reserve levels of the most competitive products, it is likely that premium levels will increase and/or guarantee periods will become shorter. This process has already started at the time this article is being written.

It’s hard to put a finger on the effect damaged public trust will have on insurance product. Will it affect which companies get sales? Will certain products be more or less desirable? Does the perceived need for life insurance coverage mean this business is less affected by trust issues than annuities, which often compete with deposit products outside the insurance industry? Does heightened media coverage lead to calls for more regulation? New regulation could clearly change product—ask indexed annuity marketers about the SEC and 151a.

And what do ratings changes mean for the insurance market? For example, single-premium immediate annuities (SPIAs) have enjoyed steady growth over the last several years as marketing fervor and consumer need have increased together. Will a future public view a SPIA purchase as less of a price-driven commodity and more of a long-term contract that requires financial stability in the providing company? If so, it seems likely that a similar thought process would enter the mind of life insurance buyers, especially those looking at permanent insurance.

Maybe this is all overstated. Many of the issues addressed above have always been a part of the insurance industry dynamic. It doesn’t take much of a change in emphasis, however, for the balance of an existing dynamic to switch a market’s focus from price to long-term carrier viability.

For companies perceived to be on the wrong side of any viability determination, that’s far from a joking matter. □