



SOCIETY OF ACTUARIES

Article from:

Product Matters!

October 2013 – Issue 87



Product Matters!

ISSUE 87 | OCTOBER 2013

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Substitute Facts for Appearances and Demonstrations for Impressions

by Jim Filmore

When I started my actuarial career in 1992, what struck me is the motto of the Society of Actuaries which is “The work of science is to substitute facts for appearances and demonstrations for impressions.”

It is amazing how often that motto has come to mind when engaged in conversations outside of work where appearances and impressions are often mistaken for facts. Perhaps it is natural curiosity, but I found myself researching some items in those day to day conversations to see how often those impressions did not coincide with the facts. The most recent example of this is during a recent business trip to Asia where I visited the Great Wall of China on the weekend. It was an impressive sight especially considering that the wall runs for thousands of kilometres. I heard a tour guide noting how the Great Wall of China is the only man-made object on earth that can be seen by the naked eye from outer space. My ears perked up when I heard that statement (which appeared to be readily accepted by the group of tourists) as the wall wasn't particularly wide despite the fact that it was very long. Thus, I decided to do some research on the internet to see if the statement made by the tour guide was true (as everybody knows that only factual information can be put on the World Wide Web). That search revealed a variety of websites that all determined that the statement was in fact a myth. While this by itself is not clear cut factual proof, there does appear to be enough data in the form of pictures taken with digital lenses from the International Space Station where one struggles to observe the Great Wall of China while the pyramids of Giza are readily apparent. The conclusion published by Scientific American is: “Though it stretches for some 4,500 miles, the ancient Chinese fortification is not as visible from orbit as modern desert roads.”

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Product Matters!

ISSUE 87 | OCTOBER 2013

Published by the Product Development Section Council of the Society of Actuaries

This newsletter is free to section members. Current issues are available on the SOA website (www.soa.org).

To join the section, SOA members and non-members can locate a membership form on the Product Development Section Web page at www.soa.org/product-development.

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Articles Needed for the Next Issue of *Product Matters!*

While all articles are welcome, we would especially like to receive articles on topics that would be of interest to Product Development Section members based outside of the United States.

Please email your articles to Jim Filmore, Kurt Guske or Stephen Peeples by November 13, 2013.

Chairperson's Corner

The Glass is Half Full!

By Paula Hodges

Those who know me best, realize that I am a hopeless optimist. Even when we're constantly bombarded with the negative news: the low interest rates, high unemployment, and massive challenges in implementing the Affordable Care Act, I like to think about the bright side. This spring, at the Life and Annuity Symposium, I heard that if interest rates stay at their current low level for another 5-10 years, it will be the end of the life insurance industry as we know it! I look at this as a time of opportunity.

History has shown that some of the toughest times bring out the best in people, so I believe that times like these bring about great innovations. In Product Development, we have always been challenged to find ways to meet the competing demands of competitive rates, profitable products, while fitting into the boundaries of increasingly complex regulatory constraints. In my opinion, today's version of these challenges will bring about a new era of protection products to meet the needs of our customers. As an industry, I am hopeful that we take this opportunity to start fresh: by reviewing our customers' core needs and then find solutions that might look different than products that we're offering today. If this means the "end of the life insurance industry as we know it"—then so be it. I am anxiously awaiting the revolutionary ideas that will come about from the current financial environment. Our companies and products may look different in the future, due to today's challenges—but that can be a good thing!

In that spirit, I'd like to share two of my favorite quotes:

- "Optimists are right. So are pessimists. It's up to you to choose which you will be." - Harvey Mackay
- "Whether you believe you can do a thing or not, you are right." – Henry Ford

Finally, as we have just elected new council members, I'd like to use this space to thank the council members who are completing their current elected terms:

- Rhonda Elming has served for three years on the council and most recently served as Secretary / Treasurer for the section.
- Stephen Peeples is also completing his three year term, currently serving as co-editor of our *Product Matters!* newsletter.
- Dave Moran accepted a 1 year appointment to the council when a vacancy opened up. He has helped with various section activities including serving on the committee for the Annual Meeting this fall.

I will be handing over the section chair responsibilities to Tim Rozar, who will be a most capable leader of the section council. With this new leadership, we are in good hands. Our glass is definitely half full! □



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So, how does all of this apply to actuaries? From my perspective, it means that an appropriate use of diligence should be applied when setting assumptions used in pricing and valuation of our business. Even when there isn't indisputable factual information for a particular item, we can often determine an appropriate assumption by testing ranges of results and also by looking outside of our markets for similar experience. I will go through two examples of how this can be done from the perspective of pricing individual life products.

My first example involves setting of mortality assumptions for table shaved business. I was first exposed to this topic when moving from a direct writing company to the world of individual life reinsurance back in 2002. From my conversation with underwriters at that time, the table shave idea essentially stems from the concept that insurance companies often did not place business with mild substandard ratings (such as Table 2, 3, or 4) as either a reinsurer or another writing company would issue that same policy at a Standard rating. To save facultative time and resources on the underwriting side and to place these "mild" substandard cases, some companies started programs where any policies within a certain level of table rating would be issued as Standard. The most common form based upon my experience was a Table 4 to Standard Shaving Program and that is what I will use for my example.

Once the underwriting parameters of the table shave program are set, the next question is what mortality should be assigned both for the pricing of the direct writing company and also for the reinsurance rates. The mortality assumptions for these programs were often not shared by the direct writing company. Thus, the reinsurer had to develop their own assumptions. One direct company

indicated that the loading for their Table 4 to Standard Shaving program should be x percent which means the proposed reinsurance rate was $(100+x)$ percent of the rate applied to the Standard class. At this point, there wasn't any credible industry experience on Table Shaved business. Thus, it would be challenging to substitute facts for impressions.

The first piece of information that I obtained was the distribution of Table 2, 3, and 4 risks prior to the launch of the Table Shave program. In this example, there was no distribution for Table 1 policies as it is common for companies to not issue at that table (i.e., the underwriter would assign debits for various impairments and it would either reach the threshold for Table 2 or would be issued as Standard). Next, I had to confirm how the table rating translates into a mortality load. The usual situation is that each table corresponds to 25 percent higher mortality. That means a policy rated Table 2 is anticipated to have 50 percent higher mortality than the baseline and a policy rated Table 4 is anticipated to have double the mortality as compared to the baseline. You may notice that I used the term "baseline" as opposed to "Standard." That was done purposely as the last component is determining the basis to which the Table loading should apply. If the underwriting ratings are debits relative to a Standard rating, then it seems appropriate to use the Standard mortality as the basis to which the mortality load is applied. In that situation, one can take the distribution of Net Amount at Risk in each table rating (2, 3, and 4) applied to the loading for that table (50 percent, 75 percent, and 100 percent) to develop a weighted average load. That would work if applicants in real life were as accommodating as numbers in an actuarial spreadsheet. However, in reality there could be a shift in the distribution of cases after the Table Shaving program was implemented. For example, say Company A has a Table 4 to Standard Shaving program and Company B does not. All else equal (which is rarely the case), the Table 3 and Table 4 risks should gravitate towards Company A as they are getting a relatively good deal while the true Standard risks and those rated up to Table 2 may find that they get the best deal when purchasing the policy with Company B (as they don't want to subsidize the Table 4 risks that will be placed in Company A's Table Shave program).

“An appropriate level of diligence should be applied when setting assumptions.”

The second complicating factor is that it may not be clear whether the table ratings are relative to the Standard Class or if they are relative to the entire non-rated population. Essentially, the question there is whether the Standard class already includes some loading as the Preferred risks are already stripped out into their own class. If one believes that is the case and if one believes that the Standard rates already include a 20 percent load over the average of the non-rated risks (i.e., the expected mortality of the combined Preferred and Standard risks), then our Table Shave load derived by the weighted average approach should be divided by 1.2 when applied to the Standard class rates. Over time, one can monitor the program (assuming that the underwriters track the pre-shaved class rating) to determine if the mix of business by class changes after the implementation of the Table Shave Program. One can also monitor the mortality experience of the Table Shave Program although it will take longer for credible mortality experience to emerge as compared to the emergence of the distribution.

My second example involves setting the lapse assumption for level term business. For the shorter duration products (5-year and 10-year) and for the first dozen or so durations of the longer duration level term business (20-year and 30-year), there would be either company specific or industry level lapse experience. When credible company specific lapse information exists, then that typically is what I consider to be the best source of information. However, company specific lapse experience would not be available for a similarly structured 30-year level term product since Actuarial Guideline XXX was not enacted until 1999 and that had a material impact on the design of level term products in the United States. That means there is credible industry level lapse experience for approximately the first 14 durations of a 30-year level term product. The question now is how to set the lapse assumption for the remaining 16 durations of this product.

One may look at the industry lapse experience and determine that it appears to level off at 5 percent by duration 12 when the experience loses credibility. Say that 5 percent lapse assumption is used for the remaining durations and the retail premiums are developed on that basis. A prudent actuary should then perform some testing to determine whether the results are sensitive to that lapse



Clearly, I'm very excited to arrive at the Great Wall of China (June 2013)

assumption. I have seen that sensitivity test performed by applying a multiple to the baseline lapse assumption (such as 125 percent lapse sensitivity and 75 percent lapse sensitivity). In my opinion, such sensitivity tests would not adequately highlight the risk in this lapse supported 30-year level term product. If our baseline lapse assumption for durations 12+ was 5 percent, then this 75 percent lapse sensitivity would be assuming a 3.75 percent lapse assumption in those years (as well as lower lapses in the earlier durations). Both of those assumptions could be far off from reality. I believe that a better sensitivity would be to hold the lapse assumption constant for the first 12 to 14 durations (where credible experience exists and where the policyholder's level premium is still overpaying to build the reserve) and to decrease the later duration lapse assumption to a much lower amount such as 1 or 2 percent. In that scenario, you will likely see profits are materially lower as compared to the baseline scenario. That lets the pricing actuary know that the choice of lapse assumption for the middle and later durations on this lapse supported product (where little experience exists) is a key pricing assumption. The pricing actuary may initially struggle to determine how they can substitute facts where none appear to exist in their marketplace.

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That is when they may need to turn to experience on that similar lapse support risk from other products or from other jurisdictions.

After a call to their living benefits department, this hypothetical pricing actuary finds out that their Long-Term Care (LTC) pricing area faced a similar dilemma back in the 1990's. The LTC pricing actuaries at that time saw the higher early duration lapse experience on their LTC products and decided to keep a relatively high later duration lapse rate (approximately 5 percent) as their baseline pricing assumption. A decade later, experience emerged indicating that while it was challenging to find people willing to initially purchase the LTC policy, the ones who purchased and kept the policy beyond the first 5 to 10 durations tended to keep their policy thereafter. That policyholder behaviour resulted in an ultimate lapse rate of approximately 1 percent per year. While this data point was not on the same product as the focus for our hypothetical term pricing actuary, it did cause him/her to pause to see if he/she could find some other sources of data that could be relevant.

The next step was to call their reinsurer who happened to have an operation in Canada. The pricing actuary found out that the Canadian marketplace had been selling a Term-to-100 product for many years. Since this product

had level premiums and no cash values (since there is no non-forfeiture regulation in Canada), it would also fall in the category of being "lapse supported" from a pricing perspective. The United States term pricing actuary found out that many of the companies offering this product in Canada initially assumed a middle and later duration lapse assumption of approximately 5 percent. That assumption seemed reasonable at the time given that the early duration lapse experience was much higher (often in double digits). However, experience emerged on this Term-to-100 product in Canada which showed that the actual lapse assumption came down to just under 1 percent. Once that revised lapse assumption was put into the valuation models, there was a material drop in the profitability of those products. Armed with these two sources of information, the prudent actuary determined that they should modify their baseline lapse assumptions on their 20-year and 30-year term product to account for the lapse supported risk.

In conclusion, there often are non-traditional sources of information that can help us "substitute facts for appearances and demonstrations for impressions" as our actuarial motto suggests. Thus, don't be afraid to build relationships outside of your current area of expertise and to keep your eyes open for insights that can be applied to your primary area of responsibility. ■