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Measure: Credible Results... Incredibly Fast!

—Donald P. Maves, FSA, MAAA, Manager - Actuarial Services
Jackie Smith, Actuarial Assistant

Measure is PolySystems' experience study system. For those of you not familiar with it, Measure studies mortality, lapses, surrenders, incidence, terminations, claim payments, policy loan utilization, premium persistency and partial withdrawals (depending on the line of business), and it is fully integrated with Master (valuations) and Delphi (projections).

Principles-based Reserves (PBR) call for a new method in setting assumptions for mortality, lapses, surrenders, etc. – a new method based on your own experience. The new method is outlined in Section 9 of the latest version of *Valuation Manual - 20* (VM-20). If "how?" is the first thing that comes to mind while reading VM-20, and specifically Section 9, then you are not alone. As an example, let's develop a procedure for setting PBR mortality assumptions (described in Section 9C). This is where Measure comes into play.

1. Determine Credibility Segments

A credibility segment is a group of policies with similar underwriting and mortality characteristics. The process of defining credibility segments will differ from company to company and depend on how plan codes are assigned. Plans can be combined or subdivided because of changes, for example, to risk classifications or premium and benefit patterns.

While the actual process will vary from company to company, the process can be simplified for all companies with detailed and organized inforce files. PolySystems supplies software to gather, edit and manage policy inventory data. Our designs are comprehensive – we cover all benefits and coverages, so it is not necessary to build spreadsheets to accommodate features that are unique. These well defined data

extract functions guarantee that data collection is dependable and of production quality.

The input file to Measure is called a PDH or Policy Detail History file. You can add custom user-defined fields to your PDH, so you have a lot of flexibility with the types of information it stores. As long as the data items are added to the PDH, they can be used to group policies with similar underwriting and mortality characteristics and establish credibility segments. Measure can then be run on all credibility segments or just specific credibility segments.

2. Determine Mortality Segments within each Credibility Segment

After policies are grouped into credibility segments according to underwriting and mortality characteristics, each of these groups should be further broken up into mortality segments. In other words, this step considers experience mortality within each credibility segment based on whether the policyholders are, for example, males or females, smokers or non smokers, preferred or standard, etc. Measure can do this step now.

Measure produces a number of reports that are fully customized by the user. The experience can be reported and organized according to issue age ranges, face amount ranges, sex, risk, class, underwriting state, plan codes and even by whether the agent is left-handed or right-handed (if you want to keep track of that).

3. Determine the Applicable Industry Basic Table

Most companies will use the UCS (Underwriting Criteria Scoring) designed by the Society of Actuaries (SoA) and American Academy of Actuaries (AAA) to determine the appropriate industry basic tables for each segment.

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Contact Jackie Smith via email at JSmith@PolySystems.com with any questions about how to log on.



4. Determine the Credibility - Adjusted Experience Rates

Once you have used Measure to calculate your experience mortality rates, you need to blend them with industry experience as represented by the industry basic tables and calculate a credibility factor. Credibility factors range between 0 and 1 and indicate the degree of credibility in your experience. A factor of 1 means 100% credibility. A credibility factor between 0 and 1 means your experience is credible, but it needs to be supplemented with industry experience.

If the number of deaths in a credibility segment is less than 30, the credibility factor equals 0 and you map directly to the appropriate industry basic table (as determined by the UCS).

If the number of actual deaths in a credibility segment is at least 30, you need to blend your company's experience rates with the appropriate industry basic table and determine a credibility factor. Measure counts actual numbers of deaths, so Measure can be used to determine whether you need to calculate a credibility factor.

The process to determine the credibility adjusted experience rates “shall be based on a statistical method consistent with accepted actuarial practice.” (VM-20, Sect. 9C, page 39). We anticipate companies will have the freedom to develop their own method as long as it can be justified. Actuaries will likely be sharing their ideas and looking for insight over the next year.

VM-20 talks about the Limited Fluctuation Method as one method for determining credibility. One method of implementing the Limited Fluctuation Method is to set your credibility factor (Z) equal to $\text{MIN}(1, (n / 3007)^{0.5})$ where n equals the number of deaths¹.

Another proposed method for determining credibility is the calculation of confidence intervals. Measure already calculates 95% confidence intervals and standard deviations for the A/E ratios and Q_x values. We can easily add the capacity to calculate other intervals as soon as an industry standard is defined.

Measure produces information that can be used by you to make your own decisions about credibility. We are always available to look at your data and offer our own suggestions about credibility.

5. Determine the Mortality Margin

After your company's experience has been blended with the appropriate industry table,

¹ Canadian Institute of Actuaries, *Educational Note on Expected Mortality*, July 2002.

a mortality margin is added. The mortality margin considers random fluctuation risk and company variation risk, and the margin is applied in the form of a percentage increase to the credibility-adjusted experience rates. The random fluctuation risk ranges from 1–10% and varies inversely with the size of the credibility factor. The company variation risk, which is zero for 100% credibility, is based on a AAA defined table (available in Appendix 3 of VM-20).

6. Derive Final Mortality Assumptions

The prudent estimate mortality assumptions equal the credibility adjusted rates plus the margin.

The process of applying the mortality margin to the credibility-adjusted experience rates will depend on the procedure used to calculate the credibility factor. We can assist you in creating a process that is efficient and of production quality.

Next Steps

Our clients are saying they want to start preparing for PBR, and Measure is the right tool to position you for a future of PBR. VM-20 has been approved by the Life and Health Actuarial Task Force (LHATF), and LHATF is in the middle of a PBR impact study. The results of the impact study are expected around March 2011, so VM-20 could go to the states for approval as early as next year. PBR is becoming more and more likely every day.

In addition, PBR is part of the National Association of Insurance Commissioner's (NAIC) Solvency Modernization Initiative (SMI). U.S. regulators are currently studying issues relating to potential uses of internal models in the Risk-Based Capital (RBC) system. An Own Risk and Solvency Assessment (ORSA) is expected to be an important element of the new RBC (target date to determine changes is 2012).

As I said earlier, Measure is fully integrated with Master and Delphi. Measure uses the Stat, GAAP and projection assumption coding that you are already using for valuations and projections. This means that if you already have a full valuation or projection setup, you can start using Measure with little additional table coding.

We are ready to further discuss Measure and PBR with you. Contact Bob Keating at 312.332.5670 or via email at BKeating@PolySystems.com for more information about Measure or scheduling a demonstration.

The NAIC Fall 2010 National Meeting is October 18–21. VM-20 and *Valuation Manual - 51* (VM-51) are likely to be hot topics of information. Stay tuned for future newsletters on how Measure can be used to fulfill the requirements of VM-51. 