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Resources

There has been much written about PBR/PBA. The following are some of the resources that an actuary should review to become current on the project

Academy of Actuaries

- C3 Phase II RBC & Reserves Project: http://www.actuary.org/life/phase2.asp
- Core Principles: http://www.actuary.org/pdf/life/consistency_sept07.pdf
- Life Capital Work Group Update: http://www.soa.org/files/pdf/2008-qc-boyko-dirico-06.pdf
- Principles-Based Project: http://www.actuary.org/risk.asp

Actuarial Standards Board (Discussion Drafts)

- Standards for Independent Review: http://www.actuary.org/pdf/life/asb_review_may07.pdf
- Standards for Reserves: http://www.actuary.org/pdf/life/asb_reserves.pdf

NAIC

- Capital Adequacy Task Force: http://www.naic.org/committees_e_capad.htm
- Life & Health Actuarial Task Force: http://www.naic.org/committees_lhatf.htm
- Principles-Based Reserving Working Group: http://www.naic.org/committees_ex_pbr_wg.htm

Society of Actuaries

- The Financial Reporter – Karen Rudolph: http://www.soa.org/library/newsletters/financial reporter/2008/march/frn-2008-iss72.pdf
- Small Talk – Norman Hill: http://www.soa.org/library/newsletters/small talk/2008/june/stn 2008-iss30-hill.pdf
- Taxing Times – Christian Des Rochers: http://www.soa.org/library/newsletters/taxing times/2008/may/tax 2008 vol4 iss2 desrochers.pdf

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PBR Recipe

Much has been written about the coming Principles-Based Reserves (PBR) for US statutory reserves. The details are still being debated by the National Association of Insurance Commissioners' (NAIC) Life & Health Actuarial Task Force (LHATF) for inclusion in the governing Valuation Manual (VM). Current drafts of the VM may be found at: http://www.naic.org/committees_lhatf.htm.

The general process, however, is fairly well determined and will be described here. After reviewing this recipe, appointed actuaries should begin mapping out the process for future valuations under this approach. For most companies, this will not be an easy project and work should begin soon. Also, product development actuaries should begin considering how this change in valuation approach will affect pricing. This has the potential of significantly changing pricing reserves and costs of capital.

Step #1 – Determine Prudent Estimate Assumptions (PEA's)

For every risk factor that is not prescribed or stochastically modeled, it will be necessary to determine PEA's. These are calculated by adding appropriate margins to a company's anticipated experience assumptions. To the extent relevant and credible, a company will use its own experience. If appropriate, these assumptions should vary according to the environment modeled in each scenario.

Mortality

The mortality assumption is a special PEA. Many of the details of this process are still being defined. A jointly sponsored project by the Academy of Actuaries (AAA) and the Society of Actuaries (SOA) produced a report in March which defined the 2008 Valuation Basic Table (VBT). Reports may be found at: http://www.actuary.org/pdf/life/tables_march08.pdf and http://www.soa.org/research/individual-life/2008-vbt-report-tables.aspx.

The eventual 2008 CSO table will likely be the tables in these reports with appropriate margins. This is discussed in http://www.actuary.org/pdf/life/mortality_may08.pdf. The 2008 VBT is actually a set of tables. The first division is between the primary and limited underwriting tables. The primary table is further divided into relative risk tables which vary from super preferred to residual standard risk.

The general process for setting the mortality assumption begins with establishing the appropriate credibility segments. These segments have similar underwriting and mortality experience characteristics. Company mortality experience for each credibility segment is then evaluated to determine whether it qualifies for the simplified method for determining the valuation mortality assumption. If it qualifies, the resulting assumption is a blend of actual experience and the valuation table determined by using the underwriting scoring process. A worksheet outlining this process can be found at: http://www.soa.org/files/xls/research-2008-score-calc.xls. Credibility segments that do not qualify will use the valuation mortality table determined by the underwriting scoring process. It is assumed that the preneed mortality tables, when completed, will be used for that business.

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Policyholder Behaviors

These assumptions include: premium payment patterns, premium persistency, surrenders, withdrawals, allocations between available investment and crediting options, benefit utilizations, other option elections, and any other identified behavior. To the extent possible, these assumptions should be based on actual experience. The actuary will need to consider carefully the impact on reserves of each assumption. Where appropriate, dynamic assumptions should be employed, being mindful of the effect of increased value of options. For example, free partial withdrawals are more likely to be elected when interest rates of competitors are higher than that of the policy being modeled.

Appropriate margins will need to be considered for these assumptions. In general, the actuary is to assume that policyholder behavior becomes more efficient over time. These margins must reflect the credibility, sensitivity, and uncertainty of the assumption. Sensitivity testing will be required. The valuation actuary must understand the materiality in variations of policyholder behavior assumptions on the resulting reserves.

Expenses

Expenses must be fully allocated. This is similar in concept to the fully allocated expenses outlined in the life illustration regulation. These expenses include taxes, licenses and fees found in Exhibit 3 of the annual statement but do not include federal taxes. The actuary is to assume that the company is a going concern and that expenses will be subject to inflation. The actuary may not reflect anticipated improvements in expenses, but may amortize certain developmental costs and capital expenditures over time. The expenses must be related to appropriate bases, such as per death incurred or per policy inforce. Appropriate margins must be added to the expense assumptions.

Step #2 – Determine Deterministic Reserve Assumptions

In addition to the PEA's, it will be necessary to determine the investment earnings and the related yield curve for modeling the deterministic reserve. The yield curve begins with the market yield curve at the projection start date, very similar to how yield curves are started with the current cash flow testing analysis. The ultimate yield curve will be specified, and is based on conditional tail expectation (CTE) statistics obtained from the recalibrated C-3 Phase 1 Generator. The current draft of the VM proposes using the 65 CTE statistics. Interim rates are linearly interpolated between the initial yield curve and the ultimate yield curve.

For equities, yields will be based on a linear interpolation between the current 10-year Treasury rate and the ultimate 10-year Treasury rate per the CTE statistics.

Defaults will be based on market experience, unless a company can justify a different assumption. In general, these margins should be higher when there is greater uncertainty, volatility, or limited experience.

Reinvested assets will be a prescribed net spread of x% (to be determined) over the risk-free based rate.

Step #3 – Determine Stochastic Reserve Assumptions

Again, the stochastic assumptions will include the PEA's. Bear in mind, however, that appropriate adjustments must be made to some assumptions based on the circumstances of the scenario.

Again, the key additional assumption is related to the investment earnings and the related yield curve for the various scenarios to be modeled. These stochastic scenarios may be generated by the AAA's C3 Phase 1 interest rate generator, may be prescribed by the NAIC, or by calibrated commercial or company generators. The details have not been worked out yet. Equity returns will have a similar process for determination.

Step #4 – Calculate Deterministic Reserves

The deterministic reserve is calculated on a seriatim basis. It is essentially a gross premium valuation using the assumptions outlined earlier. The resulting reserve for each policy is the greater of the calculated gross premium reserve and the current cash surrender value, adjusted for reinsurance if appropriate. The total deterministic reserve is the sum of all of the per policy reserves.

Step #5 – Consider Stochastic Modeling Exclusion

Some business may qualify for exclusion from the required stochastic modeling. To qualify, the company must either demonstrate that the reserve calculated provides for all material risks or pass the Stochastic Exclusion Test (SET). It is not clear how a company would qualify by using the demonstration. The current draft of the SET, however, is laid out in a report from an AAA working group at: http://www.actuary.org/pdf/life/exclusion_march08.pdf.

This recommendation is based on 16 deterministic scenarios. Reserves are calculated for each of these scenarios and a base scenario, which is a level scenario. A ratio is calculated from the results. If low enough, the business qualifies for exemption. At the current time, the pass ratio has not been determined.

- If a company qualifies for the exclusion, the resulting PBR reserve is equal to the sum of
- Deterministic reserve, as defined above
- Greatest present value of accumulated deficiency (GPVAD), using the assumptions used for the deterministic reserve. The GPVAD is defined in Step #6

Step #6 – Calculate PBR Reserve

For each of the stochastic scenarios, calculate at the end of each projection year and the model start date the net accumulated asset amount. For each of these points, the accumulated deficiency is defined as the negative of the net amount. The accumulated deficiency for each point in time is discounted back to the projection start date. The resulting reserve is equal to the sum of

- Deterministic reserve
- GPVAD, which is the maximum of the discounted value of accumulated deficiencies (positive or negative)

With the reserve calculated for each of the various scenarios, they are ranked from lowest to highest. The PBR reserve will be the average of the highest x% of the ranked scenario reserves. This percentage has not been set yet. In addition, the actuary must add, if necessary, an amount to capture any material risk not reflected in the above analysis.

Remaining Issues

There is still much to be determined about the PBR process. Members of LHATF, the NAIC, the SOA, the AAA, and many others are working feverishly to hammer out many issues. Software companies, while keeping track of the process, do not have software yet that streamlines this process. In spite of this, however, there are things that actuaries should do now to prepare for this significant change

- Review the current state of the project. More eyes are needed to fine tune this process to be as useful as possible
- Begin determining how the various PEA's are going to be developed in your company.
- Begin the evaluation of software to prepare these calculations
- Get the necessary budget for making the transition to this process. Outside assistance may be necessary on this project