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Milliman

Issues and challenges in a principle-based reserving world

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EXECUTIVE SUMMARY

While formal adoption of principle-based reserving (PBR) in the U.S. is getting close, with a likely effective date of January 1, 2017, PBR is already a reality for many companies with the release of the Rector Report and the resulting Actuarial Guideline 48 (AG48) requirements. Anticipating that these new requirements will present both implementation and financial challenges, and knowing that such challenges are not always clear until one is engaged in the work and reviewing results, we set out to create representative examples of applying the new AG48 requirements. To this end, we considered sample blocks of business representative of current cohorts that are subject to the new requirements, and attempted to do the calculations prescribed by AG48. We considered both level term business and universal life business with secondary guarantees (ULSG). There are challenges in calculating the amounts specified by AG48 as of a particular valuation date, and even further challenges when attempting to forecast those amounts into the future.

While the focus of this paper is on the potential impact of the new AG48 requirements, our findings provide an indication as to what issues the insurance industry might need to anticipate as they prepare for the wider implementation of PBR in the upcoming years.

Key takeaways are listed below by category, with the more important considerations shown at the top of each list:

Quantitative

- Not surprisingly, the AG48 requirements embed more conservatism than does the typical economic reserves (ER).

- Disallowing mortality improvement beyond the valuation date has a profound impact on reserves.

- Slight variations in plan design can have material and unexpected impact on the captive financing, particularly for ULSG.

- The increase in assumed mortality that is due to the required grade-in to the industry mortality table, combined with a lapse margin, works to increase the AG48 reserve as compared with the ER.

- The mean reversion point underlying the economic scenario generator is based on a dynamic formula that weighs heavily the recent extended period of low interest rates. As such, scenarios produce lower yield curves more frequently than historical averages resulting in a very prudent margin for PBR under the current environment.

- Because PBR requires an asset-liability model to produce the modeled reserve components, volatility associated with interest rates and a company's approach to asset management is introduced into the reserve determination process.

- Many of the asset assumptions—such as defaults, initial and ultimate spreads, and scenario sets—are prescribed.

Process complexities

- For level term business, post-level-term profits are allowed in the deterministic reserve only to the extent that a company can support them with credible experience. Most companies will need to wait for this to develop over time.

- For ULSG, the company must recognize policyholder behavior that becomes more efficient over time, unless credible company experience exists to the contrary.

- PBR creates new challenges in developing mortality assumptions, particularly when considering credibility. Credibility is important to the process of setting prudent estimate assumptions, because prescribed mortality margin levels increase with decreasing credibility.

- In setting lapse margins, the critical areas to determine are the direction of the margin in each policy year and, for term, the shock lapse at the end of the level premium period.

- Until adoption of the Valuation Manual (VM-20), AG48 specifies that the main calculations exclude yearly renewable term (YRT) reinsurance cash flows, and that a back-end adjustment be made for YRT reserve credit. Thereafter, for YRT reinsurance arrangements, AG48 specifies that Section 8 of VM-20, Reinsurance, will apply, which presents its own set of questions and complexities.

- Written documentation of the steps involved in the model set-up, refresh process, revisions and enhancements, and assumptions will be necessary not only for continuity and meeting production deadlines, but also to inform attribution analysis.

- There are many complexities that exist in forecasting the deterministic reserve (DR) and multiscenario stochastic reserve (SR), both technical and assumption-driven.

- Forecasting the DR requires a future view of Treasury curves, spreads, defaults, and the company's portfolio, as all of these items must be pushed forward in time in order to derive the discount rate that a company may be using at a future valuation date. This is an exercise that must be performed because companies need to understand future financing needs.

System complexities

- Our analysis reveals the complexities of shaping a projection system or model into one that is able to process on two paths: an outer path where the model forecasts the population (of liabilities and assets) according to best estimate or baseline assumptions, and an inner path where the determination of VM-20 DR and SR is based on other than baseline assumptions, i.e., the assumptions compliant with VM-20.

- AG48 dramatically increases the run time necessary for reserve calculations.

- The practitioner applying AG48 methodology (and ultimately PBR) may need to find a way for multiple systems to effectively communicate with each other, for example if one system is used for developing the net premium reserve (NPR), and a different system is used to calculate the DR and SR.

- There are a number of potential company-specific and system-specific issues that may arise in the development of spread and default assumptions as prescribed in VM-20.

This paper discusses the impact of the various steps in the development of an AG48 reserve as compared to the ER, for the term and ULSG demonstration products used in this analysis.

For the term policies, the graph in Figure 1 on page 4 shows the effect of including successive individual margins and adjustments in the ER calculation to build up to the AG48 DR. The lowest line is the ER (present value of best estimate liability cash flows during the level term period with discounting at 3.63%, floored at zero), which crests at approximately 23% of the peak statutory (XXX) reserve.
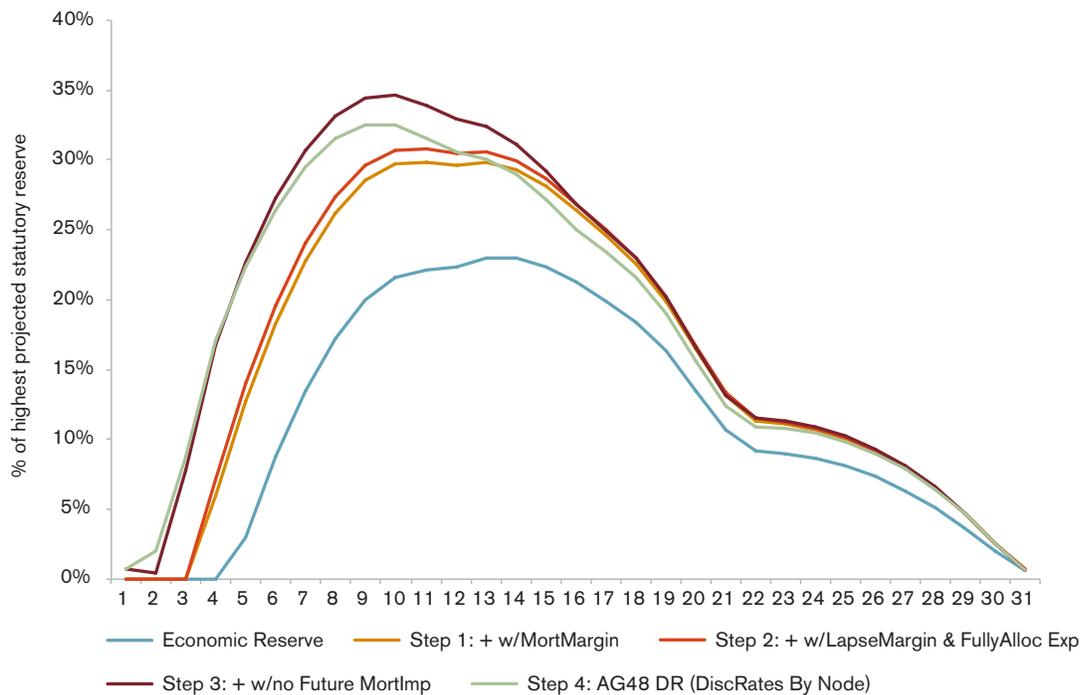
Step 1 starts with the ER, and introduces the mortality margin prescribed by VM-20. At 100% credibility, the prescribed margin increases the present value of cash flows to above zero a year earlier, and more than doubles the present value of cash flows by year 5, with the increase grading off thereafter. After reflecting the mortality margin, the peak present value of cash flows increases to approximately 30% of the peak statutory reserve.

Step 2 introduces the lapse margin (approximately 10% lower lapses) and reflects fully allocated expenses in addition to the mortality margins in Step 1. This step is not as significant as Step 1.

Step 3 expresses the implicit margin of disallowing recognition of mortality improvement in future discounted cash flows. The combined impact of Steps 1, 2, and 3 more than triples the present value of cash flows in the early years, compared with the ER, grading down to being 50% higher than the ER by year 10, and then grading down to approximately 20% to 30% higher in later years. Reflecting these three steps increases the peak present value of cash flows to approximately 35% of the peak statutory reserve.

Lastly, **Step 4** reflects using a different stream of deterministic reserve discount rates at each node (generated from a base case projection with portfolio rates that grade from 3.00% to 5.25% over approximately 30 years). This has the effect of increasing the present value of cash flows in the first few projection years, then slightly lowering it by approximately 3% to 7% thereafter. After reflecting all of these steps, the peak present value of cash flows is approximately 33% of the peak statutory reserve.

FIGURE 1: TERM INSURANCE—STEPWISE PROGRESSION FROM ER TO AG 48 DETERMINISTIC RESERVE

An analysis similar to that performed for term is also performed for a representative ULSG product. The steps used in the regression are similar: Step 1 starts with the ER and introduces the mortality margin prescribed by VM-20; Step 2 introduces the lapse margin and expense margins; Step 3 expresses the implicit margin of disallowing recognition of mortality improvement in future discounted cash flows. For ULSG, like term, the impact of Step 3 is noticeable. Altogether, Steps 1, 2, and 3 produce an amount that is approximately 18% greater than the ULSG ER in early periods, grading off over time. Lastly, the interest rate used to discount cash flows is changed from 4.5%, the ER discount rate, to 4.0%, which is a simplified proxy for a projected DR discount rate. As an implicit margin, this too has a material impact on the level of AG48 DR, bumping the liability another 17% in early periods, for a total of approximately a 35% increase from the ER early on and grading down as the forecast moves further into future periods. Although this may seem a result more subtle when compared to the term results above, it is critical to understand that the impact of VM-20 requirements on ULSG products will depend on product design, more so than for term insurance.

Details on the regression analysis results for term and ULSG are provided in the Graphical Demonstrations section that begins on page 14.

INTRODUCTION

In this paper, we primarily seek to analyze, understand, and communicate the impact of PBR. The new AG48 requirements serve as an effective test case to illustrate the important considerations for both PBR and captive financing solutions going forward. We have added an appendix to the end of this paper that summarizes historical background to PBR and AG48. Additionally, because this is an early practical application of the Valuation Manual (VM-20) methodologies, our findings provide an indication as to what issues the insurance industry might need to anticipate as it prepares for the wider implementation of VM-20 in the upcoming years.

This paper will cover various processes and considerations related to the enactment of VM-20:

- Impact of plan design
- Assumption determination
- Impact of credibility and margins
- Interest rate assumptions and volatility
- Implementation challenges

The table in Figure 2 summarizes key AG48 parameters and considerations and how they differ from the industry's general approach to economic reserves.

FIGURE 2: PARAMETERS AND CONSIDERATIONS OF AG48		
PARAMETER/CONSIDERATION	**ER APPROACH**	**AG48 ACTUARIAL METHOD**
Mortality and Credibility	Actual company experience influenced by company's anticipation of future mortality experience. A margin may or may not be included.	VM-20 specifies the prudent estimate mortality assumption as building from credible company experience, including a prescribed margin and grading into industry experience with a margin.
Mortality Improvement	Typically included in the assumed mortality.	Mortality may be improved up to but not beyond the valuation date.
Lapse	Company experience.	Company experience where relevant and credible, including a margin.
Post-Level Term	ER are typically set to equal statutory reserves after the level premium term period.	Company must limit post-level-term profits to reflect the relevance and credibility of the lapse and mortality experience, approaching zero for periods where the data has little credibility or relevance.
Expenses	Typically only captive expense allowances are recognized.	Fully allocated with inflation. Expense assumptions should reflect direct and indirect costs associated with the policies, as well as overhead costs allocated to the policies.
Reserve Discount Rates	Typically, a level interest rate specified by the treaty, representing the company's anticipated long-term earnings rate. Often, a negotiated item with financing providers.	An asset model is required in order to generate the appropriate net asset earnings rates for VM-20 requirements. There are several prescribed characteristics to the asset assumptions, including credit spreads, default costs, the aggressiveness of the investment strategy, and the prescribed interest scenarios.
Reinsurance	Reinsurance cash flows are typically included in the determination of the ER.	Until VM-20 has an operative date, the main AG48 analysis is performed on a direct basis, with specified adjustments for exempted reinsurance arrangements. Once operative, cash flows from exempted reinsurance arrangements are included in the determination of the DR and SR.
Net Premium Reserve	N/A	A formulaic reserve intended to represent the tax-deductible amount, and regulatory floor. Under AG48, the NPR must be calculated for term and ULSG policies alike.
Stochastic Reserve and Exclusion Test	N/A	SR is a stochastic component to the VM-20 reserve requirements. Under AG48, this component must be calculated for ULSG policies. Unlike VM-20, the stochastic exclusion test is not available within AG48.
Primary Security Amount	The reason for calculating ER is to determine the amount of high-quality assets to be held in support of the subject policies.	The primary security amount is determined by following the Actuarial Method outlined in AG48, which is defined as: Term: Max (NPR, DR) ULSG: Max (NPR, DR, SR)

IMPACT OF PLAN DESIGN

The product types that are affected by AG48 are level term products and universal life with secondary guarantees (ULSG). Covered Policies include non-grandfathered policies and policies issued on or after January 1, 2015, that are required to be valued under the Valuation of Life Insurance Policies Model Regulation (Model 830) and have risk ceded to an assuming reinsurer where that ceded risk is not exempted. We considered both term and ULSG as well as plan designs within each product type in order to gauge the sensitivity to plan differences. Even slight nuances in plan design can have large and unexpected impacts on the captive financing.

TERM

The term insurance plans typically included in transactions subject to AG48 are 10-, 15-, 20-, and 30-year level premium term designs with increasing premiums thereafter, generally to age 95. Redundant statutory reserves are considered to be the excess of statutory reserves (XXX method) over the company's ER. The critical assumptions built into these ER definitions include mortality, mortality improvement, lapse, and ER discount rate. ER are usually gross premium valuation type reserves discounted at a known discount rate (or rates), agreed upon between parties to the transaction.

Enter AG48, which points to VM-20 as the basis for determining the Actuarial Method reserve (AM). For term, the AM is set at the greater of the NPR and the DR. Because this construct will serve as the statutory minimum reserve for future issues after the VM-20 operative date, it was felt that defining the AM this way would minimize the necessity for reserve financing transactions in the future. Looking at the differences in assumption set-up, one can see that under AG48, the DR will carry considerably more conservatism than does the typical base case ER.

Mortality

Companies participating in the reserve financing market are generally companies with high levels of credibility in their mortality experience and sufficient data periods that run into the later durations. Even so, the 30-year level premium term product may require a grade-in to industry mortality sometime during the 30-year period. This increase in assumed mortality, combined with the decrease in lapse described below, works to increase the AM as compared to the ER.

Mortality improvement

VM-20 specifically disallows assuming mortality improvement beyond the valuation date. In forecasting the DR, we have found this guardrail to make a significant difference in the DR (or AM) amount when compared with the ER, which typically assumes mortality improvement in future cash flows.

Lapse

Lapse experience studies for blocks of term products usually show higher lapse rates in early durations, dropping to a steady, low rate in later durations. Ignoring the post-level term period, increasing lapse rates tend to reduce the present value of net cash flows (or ER), while reducing lapse rates tends to increase the present value of net cash flows. This implies that the margin for lapse should be a reduction to the base rate rather than an increase. However, the direction of the lapse margin is complicated by post-level term profits. Whether the margin component will be an increase or a decrease to the anticipated experience will depend on whether the company has profits in the post-level term period and whether those profits are assumed to come through the cash flows considered in the modeled reserve. Relevant and credible experience for the post-level term policyholder behavior is only beginning to emerge, and only for the shorter level-term periods.

Not as well understood is the degree of shock lapse at the end of the level premium period, and the ensuing mortality deterioration as a result of those lives choosing to pay the considerably higher premium each year following the initial level period. VM-20 recognizes the importance of the shock lapse assumptions and allows post-level-term profits only to the extent that a company can support them with credible experience. At this point in the history of these products, a company may have credible experience for the 10-year level term product, but not the longer periods. Companies may wrestle with whether the experience for the 10-year product can be thought to translate to the 15-, 20-, or 30-year product. Many companies have taken the position to start with, assuming a 100% shock lapse, understanding they will recalibrate this as experience unfolds. This is a sensitive assumption, because shock lapse rates that are less than 100% allow post-level-period profits to be included in the present value of cash flows, thus reducing the DR at all valuation dates during the level term period.

Discount rate

Calculating the AG48 reserves as of a valuation date is based on treasury rate scenarios prescribed by VM-20; however, forecasting the DR amounts in future periods requires having an understanding of or an assumption for: 1) what the U.S. Treasury interest rate curve will look like at future valuation periods; 2) what the company's asset portfolio will look like at those periods; and 3) what the prescribed asset spreads and asset defaults charges in VM-20 will be at those future periods. All of these items must be pushed forward in time in order to derive the discount rate that a company may be using at a future valuation node. This is an exercise that must be performed because companies need to communicate their financing needs, not only now, but more importantly in future years. This process clearly differs from the typical approach taken in ER determination, which can be as simple as a static expected earnings rate, sometimes with a margin.

Graphical analysis

To help understand the magnitude of the impact of AG48, the graph in Figure 3 shows the statutory (XXX) reserve, ER, AG48 DR, and AG48 NPR for a block of level term business issued over two years. We show the AG48 DR assuming no mortality improvement (dotted line) and assuming mortality improvement up to (but not beyond) each valuation node (solid line). The peak AG48 reserve is approximately 30% to 40% of the peak statutory reserve, compared with the ER, which peaks at approximately 23% of the statutory reserve.

FIGURE 3: TERM INSURANCE STATUTORY (XXX) RESERVES, AG48 RESERVES, AND ER
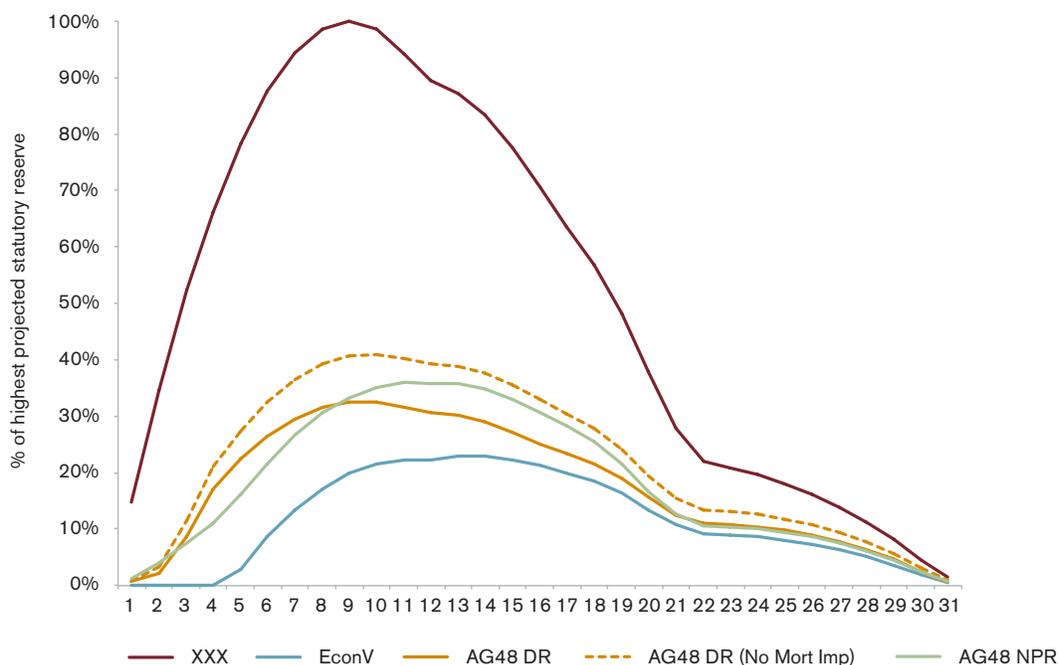
UNIVERSAL LIFE WITH SECONDARY GUARANTEES

For ULSG business, we analyzed a single-tier shadow account product that keeps the policy in place even when the account value falls to zero as long as the shadow account is positive. A multitier product takes this a step further by layering multiple shadow accounts, each with its own levels of interest credited, cost of insurance (COI) charges, and policy loads. Obviously, this leads to a whole new level of complexity in the ULSG design and further complicates VM-20 analysis. We discuss multitier product design later. With any ULSG product, variations in plan design can have material and unexpected impact on the AG48 impact. As such, it is important not to overgeneralize from our sample analysis that follows.

SINGLE-TIER

We built a model of a product with a single shadow account design, generally based on similar products available in the market. The model includes issues from the prior 18 months. The business is fully underwritten and the mortality experience is based on a recent study where experience is 50% to 60% credible. Lapse experience is also based on a recent experience study where we determine (for purpose of this sample calculation) the first five or six policy durations to be relevant and credible. For later durations, lapse rates are graded down to 1% by policy year 20. The expense assumptions reflect fully allocated expenses. Premium funding is set at levels, based on recent payment behavior and billed amounts.

For ULSG, the AM is set at the greater of the NPR, the DR, and the SR. A company with Covered Policies will need to understand the relationship of these components over the period of coverage, which is considerably longer than for term insurance. In this analysis, we forecast all components except the SR. Forecasting the SR introduces several complexities, not the least of which is simply the time it takes to perform. For information regarding the approach companies are taking to forecast the SR, refer to the section on Forecasted Stochastics.

For this analysis, the ER uses experience assumptions for mortality, which includes mortality improvement and eventual grading to industry tables for policy years beyond where credible experience exists. ER assumptions do not include any explicit margins on lapse, mortality, or expenses, and the rate used to discount cash flows is 4.5%. To illustrate the relationship of the AG48 components in contrast to the ER, the chart in Figure 4 shows the forecasted values for these items for the product design described above.

FIGURE 4: ULSG STATUTORY (XXX) RESERVES, AG48 RESERVES, AND ER
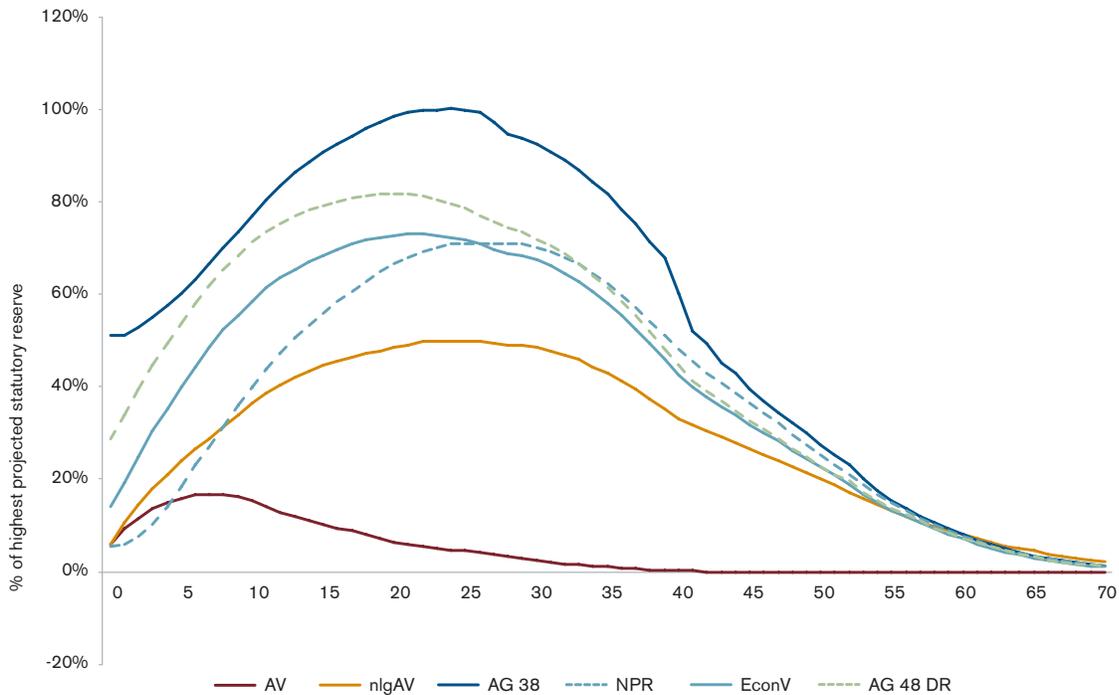
For this product and the manner in which it is funded, the NPR is the lowest component, even lower than the ER until much later in the forecast. The NPR valuation rate used in the analysis is 4.5%. The AG48 DR is greater than the ER, which is due to required margins on all risk factors, lower discount rate, and absence of future mortality improvement at each valuation node. The table in Figure 5 shows the percentage increase in AG48 DR over ER. The impact of AG48 for even the simplest shadow account design products is a reduction in reserve financing needs over the lifetime of the product.

FIGURE 5: PERCENTAGE INCREASE IN AG48 DR OVER ER							
Projection Period (years)	5	10	15	20	30	40	50
Increase in DR over ER	35%	21%	16%	12%	7%	5%	1%

The objective of setting the AM amount consistent with the VM-20 requirements is to set the stage for reducing the need for redundant reserve financing, and thereby reduce the need for captive reinsurers. The success of this remains to be seen, as each direct writer and each ULSG product will generate a unique relationship of VM-20 components and ER. As shown in this example, a gap remains between the company's statutory reserve and the AG48 DR that could continue to be financed, albeit at a reduced level from pre-AG48 levels.

MULTI-TIER
A multitier ULSG product is designed to include two or more shadow account mechanisms in addition to the general account value mechanism. Companies have used this product design to, among other things, encourage certain premium payment behavior (i.e., limit the pre-funding of the contract) or to better shape the statutory reserves under Model 830. As a result of the many unique features, this product does not lend itself to a representative or typical design and so is difficult to portray in a generalized manner. However, we would be remiss if we did not mention the multitier ULSG design in the context of AG48.

The examples in this report are meant to illustrate relationships between the AG48 DR amount, a company's ER, and the Model 830 statutory reserves. The reader should understand that our examples are not inclusive of all the possible product designs in the industry. In fact, each ULSG product can exhibit unique reserve patterns compared with the one illustrated, as noted earlier. That said, there are characteristics of sophisticated ULSG product design that impact reserve patterns. These include but are not limited to:

- The number of shadow account mechanisms and the strength of the secondary guarantee, in other words the cost to the policyholder for keeping the secondary guarantee active.

- The length of the secondary guarantee, e.g., lifetime, to age 100, 20 policy years, etc. Longer secondary guarantee periods result in higher levels of DR amounts as compared with shorter secondary guarantee periods.

- The existence of extended maturity options.

- Survivorship policies versus individual policies.

We provide no illustrations for the multitier ULSG product type, because any illustration we would provide would be so specific to a particular product design that its impact would not necessarily translate to any given company's situation.

ASSUMPTION DETERMINATION

MORTALITY

VM-20 defines a mortality segment as a group of policies that the company expects will have mortality experience different from other groups of policies (such as male vs. female, smoker vs. nonsmoker, preferred vs. super-preferred vs. residual, etc.). This seems to imply that the definition of a segment should precede determination of credibility and margin.

It is important to document the definition of mortality segments and subsegments. The definitions of segments and subsegments determine the level of credibility, which in turn determines the level of prescribed margin and data sufficiency period. We also note that VM-20 indicates that "when determining the company experience mortality rates for each mortality segment, the company can base the mortality on more aggregate experience and use other techniques to further subdivide the aggregate class into various subclasses or mortality segments. In so doing, the company must ensure that when the mortality segments are weighted together the total number of expected claims is not less than the company experience data for the aggregate class." For example, consider a company with an anticipated mortality assumption expressed as scalars (e.g., that vary by risk class) applied to industry or internal company tables, and an experience study for which the expected mortality is set to the anticipated mortality assumption. In this case, the credibility associated with the aggregate experience can be used for determining margins. If, however, the company wishes to further subdivide its VM-20 assumption by face-amount band, it would need to provide the demonstration discussed in the manual.

As a practical matter, a company's implementation of the AG48 mortality assumption in the cash flow model should anticipate sensitivity testing. In other words, it will not be a simple task to run a mortality sensitivity if the components of mortality rate and margin are not identified separately. Some companies create AG48 mortality assumption tables in a spreadsheet process that reflects grading to industry tables, as opposed to loading in the company experience and industry tables separately into the modeling system, and applying the required margins and doing the grading in the modeling system. An outside spreadsheet approach may present challenges in running mortality sensitivity scenarios, depending on the definition of the scenario. For example, for a sensitivity that increases company mortality experience by 10% without changes to industry mortality (i.e., a mis-pricing sensitivity), the outside spreadsheet approach will require generating and loading alternate AG48 mortality assumption tables, as opposed to a simple adjustment using the approach that does the grading in the modeling system.

VM-20 indicates that "Mortality improvement shall not be incorporated beyond the valuation date. However, historical mortality improvement … to the valuation date may be incorporated." This presents a particular challenge in forecasting the deterministic reserve. For calculating a DR at a future point in time (a node), we have developed logic to reflect improvement up to that node, but not beyond. In reality, an actual valuation at that future point in time will reflect mortality improvement in the DR to the extent it is supported by actual experience.

Theoretically, in forecasting the DR, one could account for changes in mortality credibility and lengthening data sufficiency periods and therefore changes in margins and credibility grading. This is a complication beyond the scope of any modeling we have seen so far, and ignoring this aspect of forecasting is conservative.

LAPSE

Most companies have credible lapse experience, or use pricing assumptions. To the extent that lapse experience is lacking, for example at longer policy durations, sensitivity testing should be utilized. VM-20 requires the company to consider a greater margin for risk factors for which the company has limited or less relevant data. Credible experience is generally limited to the early policy years because these products were introduced post-2000.

PREMIUM FUNDING LEVEL

For UL products, particularly ULSG, while the premium assumption is a critical assumption, there is little specific guidance in VM-20 regarding how to set these assumptions, other than the sections General Assumption Requirements and Policyholder Behavior Assumptions.

Section 9.D.1.f of VM-20 indicates that the company shall determine prudent estimate policyholder behavior assumptions such that the assumptions are assigned to policies in a manner that provides an appropriate level of granularity. Given the flexible nature of the product, this suggests seriatim modeling, which we see is commonly done by companies.

Section 9.D.4.a indicates that companies must consider premium payment pattern sensitivity tests, in particular:

- Minimum premium scenarios.

- No further premium payment scenario.

- Prepayment of premiums: Single premium scenario.

- Prepayment of premiums: Level premium scenario.

REINSURANCE

AG48 (paragraph 5.A.4.a. iii and iv) requires that cash flows from reinsurance qualifying as exempt arrangements be excluded in the AM calculations performed prior to the date that VM-20 is operative (which is defined as the year following the year where legislative approval is achieved by 42 states, representing 75% of premium by July 1). For calculations performed before the VM-20 operative date, the AM is determined on a gross of reinsurance basis and adjustments are made to reflect coinsurance and YRT reinsurance. For coinsurance, the adjustment is to reduce the AM by, at most, a percentage equal to the quota share ceded in the exempt coinsurance arrangement. For YRT reinsurance, the adjustment is to reduce the AM by at most an amount reflecting ½ cx. After the operative date, AG48 specified that Section 8 of VM-20 (the reinsurance section) shall apply.

Before the operative date however, issuing companies will likely need to see the impact of reinsurance cash flows on the financials, even though excluded from the AM amount. This may require some custom modeling logic to accommodate two presentation approaches: 1) where the AM calculation ignores reinsurance cash flows, and 2) where the financial statements generated by the cash flow model reflect reinsurance cash flows.

After the operative date, AG48 specifies (paragraph 5.A.4.b) that, regarding YRT reinsurance, the AM amount will be calculated according to Section 8 of VM-20, meaning that it includes reinsurance cash flows and no ½ cx adjustment. From a direct writer perspective, reinsurance is normally expected to be a net cost. The model may tell a different story if the modeling is simply to code the treaty premiums and amount of risk reinsured. It may end up being either a smaller net cost or possibly a net benefit to the direct writer. This is because the mortality basis in the model is the VM-20 assumption (graded to industry, no improvement, and with margins); while the reinsurance premiums are consistent with treaty provisions and include no explicit margin.

There are many questions that surround the treatment of reinsurance under AG48. Reinsurance handling is a priority for the regulators and we anticipate additional regulatory guidance in the near future.

IMPACT OF CREDIBILITY AND MARGINS

MORTALITY

Measuring credibility of mortality experience is a long-practiced exercise. A vast majority of companies understand and are comfortable with the limited fluctuation method. In the context of determining AG48 AM amounts, companies in this space likely fall into the bracket of 80% to 100% limited fluctuation credibility, which is due to the amounts of term or ULSG insurance issued and requiring reserve relief. Longer sufficient data periods (as defined by VM-20) generally go along with high credibility. For term writers, this implies the company's experience is permitted to be recognized during most of the level term period; i.e., no industry rates necessary, which is due to high credibility coupled with many years of sufficient data. Mortality margins in this category are the lowest available: 5.3% for attained ages less than 46, grading to 2.3% for attained ages 77 and over. Mortality is an assumption that is to be reevaluated at least every three years, and the company's assumption realigned with emerging experience. We can also expect adjustments to the margin tables prescribed by VM-20. The proposed 2015 Valuation Basic Table (VBT) comes with a recalibration of margins under the limited fluctuation method. The proposed margin table is to be used only when credibility is calculated on an amount (not a number) basis. The credibility categories are similar, with the exception that the topmost category (80% to 100%) has been split in two: (80% to 90%) and (90% to 100%). The proposed mortality margin table is more granular and, like the 2015 VBT, has considerably more industry experience supporting it.

A second margin table is available with the proposed 2015 VBT, based on the Buhlmann method of credibility. In order to use the Buhlmann method margins, a company must know its credibility measure under the Buhlmann approach, which is more complex than under limited fluctuation. Without going in to specifics, the Buhlmann table has credibility categories that are more granular at the upper credibility levels than the lower levels. For the highest credibility categories, margins under the Buhlmann table are lower than limited fluctuation margins.

Although mortality margins are prescribed, for future valuations there may be choices a company can make regarding the approach to credibility measurement that will have an impact on the level of prescribed margin amounts.

For demonstration, the table in Figure 6 is based on the limited fluctuation method of credibility, showing the minimum number of deaths needed for full credibility (100% column) and the partial credibility measurement for exposures less than this minimum. Figure 6 reflects a 95% probability level with a 5% margin for error. VM-20 requires at least a 95% probability level, with an error margin of no more than 5%. The formula used for partial credibility is:

$$\text{(Actual claims/minimum claims for full credibility)}^{0.5}$$

Please refer to the American Academy of Actuaries Credibility Practice Note of July 2008 for additional details on the limited fluctuation method of credibility.

FIGURE 6: NUMBER OF DEATHS BY PARTIAL CREDIBILITY PERCENTAGE					
Credibility percentage	20%	40%	60%	80%	100%
Number of deaths	61	246	553	983	1,537

Credibility is important to the prudent estimate experience because prescribed mortality margin levels increase with decreasing credibility. Prescribed mortality experience margin percentages for a sample of attained ages are shown in Figure 7, corresponding to the various partial credibility percentages from Figure 6.

FIGURE 7: PRESCRIBED MORTALITY MARGIN PERCENTAGES					
Credibility percentage	20%	40%	60%	80%	100%
Attained Age 45	13.7%	8.4%	6.3%	5.3%	5.3%
Attained Age 55	10.4%	6.4%	4.8%	4.0%	4.0%
Attained Age 65	7.2%	4.4%	3.3%	2.8%	2.8%

LAPSE AND PREMIUM FUNDING LEVEL

Compared with mortality, less prescription and more judgment surround the lapse rates in the assumption set.

For term insurance, the critical areas are: 1) direction of margin by policy year, and 2) shock lapse rate at the end of the level premium period. As discussed earlier in the paper, these two can be dependent upon each other. Ignoring post-level term profits (i.e., 100% shock lapse at end of level term period), lapse margins for level premium term insurance are typically assessed by reducing baseline lapse rates during the level premium period, rather than increasing them, at least after the first few durations. If the shock lapse rate assumption is something less than 100%, then the margin during the level term period may be an increase or a decrease to the anticipated experience. Sensitivity testing will help assess the direction of the margin in this situation. Margins on baseline lapse rates after the level premium period (i.e., after the shock lapse) are assessed as increases to the rate, for products with positive post-level term profits.

For a ULSG product, lapse and premium funding go hand in hand because of the design of the no-lapse guarantee provisions. The critical areas in the lapse assumptions are (1) implementing logic such that policyholder behavior maximizes the value of a no-lapse guarantee, and (2) determining when a company's experience is no longer credible enough to rely upon and what to base lapse rates on when this occurs. The general requirements in VM-20 regarding assumptions indicate that the company must recognize policyholder behavior that becomes more efficient over time, unless credible company experience exists to the contrary. In terms of a no-lapse guarantee, increasing policyholder efficiency is commonly thought of as minimally funding the insurance coverage or ceasing payments into the contract when the secondary guarantee provision is fully funded. Mechanically, in the modeling system, this requires knowing where each contract is on the funding continuum of valuation dates and establishing anticipated payment behavior going forward. Future premium payment behavior will also be dependent upon market and billing practices.

Most companies do not apply a specific premium payment margin. It is possible that a company may find that it gets lower reserves when it applies a positive or negative margin to the premium payment, indicating that it does not seem reasonable to apply any margin. This could result as more premium would take policies out-of-the-money, and less premium would mean that policies are in-the-money for shorter time periods or lapsing sooner if payments are below minimums.

For durations where the company's lapse experience is not credible, VM-20 points to the Canadian Institute of Actuaries Lapse Experience Under Term-to-100 Insurance Policies (2007). Using this as an industry standard is not a panacea, however. The report clearly states the study was limited to the 25th duration as data beyond duration 25 was very limited. In fact, data beyond duration 20 has relatively low statistical credibility. In the context of ULSG contracts, it is the longer durations where such an industry metric is really needed. In spite of these limitations, the Canadian study does provide interpretations of the data from a variety of characteristic groupings. A company using data from this report will need to determine whether a specific grouping is appropriate for its business and, if not, to use the composite table; and will also need to determine what to assume after the 20th or 25th policy year.

GRAPHICAL DEMONSTRATIONS

To help understand the impact of margins on the AG48 deterministic reserve (DR) our analysis steps through the successive layering of explicit and implicit margins and adjustments on the ER. Explicit margins, for purposes of this analysis, include mortality margin, lapse margin, and margins on expenses. Implicit margins and adjustments include the limitation on mortality improvement in future cash flows and the discount rate requirements found in VM-20.

For the cohort of term policies, Figures 8 and 9 show the effect of including successive individual margins in the ER calculation to build up to the AG48 DR. The lowest line is the ER (present value of best estimate liability cash flows during the level term period with discounting at 3.63%, floored at zero), which crests at approximately 23% of the peak statutory (XXX) reserve.

Step 1 starts with the ER, and introduces the mortality margin prescribed by VM-20. At 100% credibility, the prescribed margin increases the present value of cash flows to above zero a year earlier, and more than doubles the present value of cash flows by year 5, with the increase grading off thereafter. After reflecting the mortality margin, the peak present value of cash flows increases to approximately 30% of the peak statutory reserve.

Step 2 introduces the lapse margin (approximately 10% lower lapses) and reflecting fully allocated expenses in addition to the mortality margins in Step 1, the more significant step.

Step 3 expresses the implicit margin of disallowing recognition of mortality improvement in future discounted cash flows. The combined impact of Steps 1, 2, and 3 more than triples the present value of cash flows in the early years compared with the ER, grading down to being 50% higher than the ER by year 10, and then grading down to approximately 20% to 30% higher in later years. Reflecting these three steps increases the peak present value of cash flows to approximately 35% of the peak statutory reserve.

Lastly, **Step 4** reflects using a different stream of deterministic reserve discount rates at each node (generated from a base case projection, with portfolio rates that grade from 3.00% to 5.25% over approximately 30 years). This has the effect of increasing the present value of cash flows in the first few projection years, then slightly lowering it by approximately 3% to 7% thereafter. After reflecting all of these steps, the peak present value of cash flows is approximately 33% of the peak statutory reserve.

FIGURE 8: TERM INSURANCE—STEPWISE PROGRESSION FROM ER TO AG 48 DETERMINISTIC RESERVE
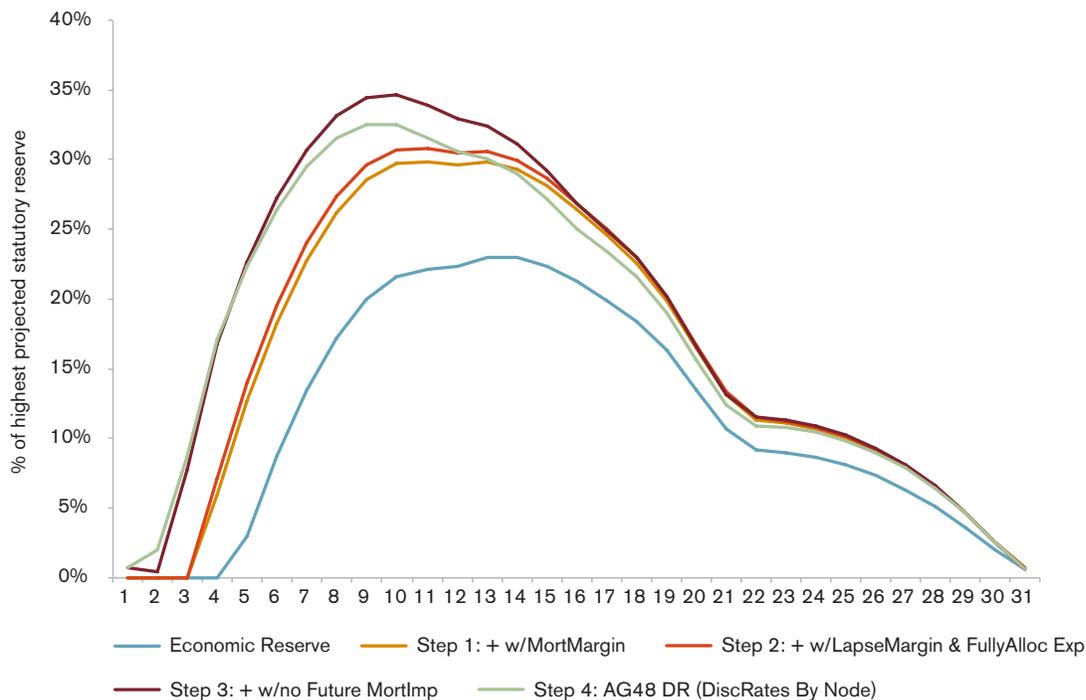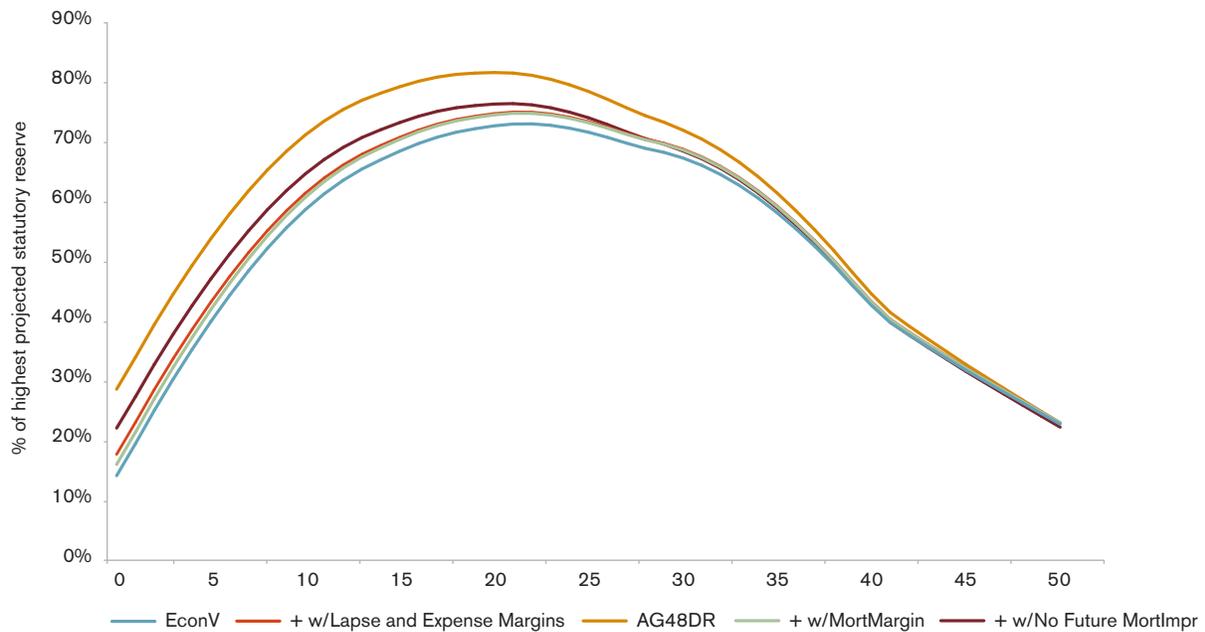
FIGURE 9: TERM INCREASE FROM ER BY PROJECTION PERIOD					
STEP	5	10	15	20	30
1: +Mortality Margin	109.5%	35.0%	24.6%	22.5%	27.4%
2: +Lapse Margin and Fully Allocated Expense	123.7%	38.9%	26.7%	24.2%	27.8%
3: +No Future Mortality Improvement	211.6%	53.3%	26.6%	23.1%	6.1%
4: AG48 DR	201.8%	42.4%	18.0%	15.5%	6.4%

Time 0 is not shown as the ER is zero.

For the cohort of ULSG policies, a similar analysis is shown in Figures 10 and 11. The first noticeable characteristic is that the difference in the data lines in Figure 10 is more difficult to discern because the time period over which the ULSG analysis is run is considerably longer than for the term analysis. Figure 11 helps quantify the impact of each step as measured against the ER. Step 1 starts with the ER and introduces the mortality margin prescribed by VM-20. At 50% to 60% credibility, the prescribed margins add approximately 5% to the liability in the early periods, grading off over time. Step 2 introduces the lapse margin, which is -10%, and expense margins of 10%, in addition to the mortality margins from Step 1. This step adds another 3% in the early periods and puts the liability approximately 8% higher than ER initially, grading off over time. Step 3 expresses the implicit margin of disallowing recognition of mortality improvement in future discounted cash flows. The impact of this step is noticeable, adding approximately 10% to the liability in early periods. Altogether, Steps 1, 2, and 3 produce an amount that is approximately 18% greater than ER in early periods, grading off over time. Lastly, the interest rate used to discount cash flows is changed from 4.5%, the ER discount rate, to 4.0%, which is a simplified proxy for a projected DR discount rate. As an implicit margin, this too has a material impact on the level of AG48 DR, bumping the liability another 17% in early periods, for a total of approximately a 35% increase from the ER early on and grading down as the forecast moves further into future periods.

FIGURE 10: ULSG ER, MARGINS, AND AG48 DETERMINISTIC RESERVES

FIGURE 11: ULSG INCREASE FROM ER BY PROJECTION PERIOD

STEP	0	5	10	15	20	30	40	50
1: +Mortality Margin	13.3%	5.1%	3.5%	2.9%	2.5%	2.0%	1.4%	1.0%
2: +Lapse and Expense Margins	25.3%	8.2%	4.7%	3.4%	2.8%	2.2%	1.5%	1.1%
3: +No Future Mortality Improvement	56.3%	17.9%	10.2%	7.0%	5.0%	1.8%	0.4%	0.0%
4: AG48 DR	102.3%	34.7%	21.3%	15.8%	12.3%	6.9%	4.5%	0.9%

INTEREST RATE ASSUMPTIONS AND VOLATILITY

Unlike some of the liability assumptions, a number of the asset assumptions are prescribed. The critical prescribed assumptions are: 1) default rates, 2) initial spreads, 3) ultimate spreads, and 4) scenario sets. With each of these, it will be critical for the National Association of Insurance Commissioners (NAIC) to update them in real time.

Each company will specify its own investment expenses, reinvestment strategy, and current credit rates. The AM is also, of course, dependent on the existing assets (with certain quality, weighted average life, and other characteristics) allocated toward the Covered Policies.

For universal life products that are subject to a stochastic reserve calculation, the number of scenario sets to be run cover a large universe of potential returns, allowing a reasonable test of interest rate volatility and thus interest rate risk.

Because PBR requires an asset-liability model to produce the modeled reserve components (DR and SR), volatility associated with interest rates and a company's approach to asset management is introduced into the process. Discussed below are examples of how this volatility comes about.

▪ **Change in VM-20 prescribed interest rates from period to period:** Based on preliminary testing, a change in the scenario sets resulting from a 100 bps change in the initial yield curve utilized to generate the scenarios can result in liabilities that are significantly different than the liabilities determined at the prior year-end. This will be affected by liability duration and whether cash flow is available to invest. If the block of business analyzed is in a cash outflow position, the impact would likely be smaller because new investments are not occurring, although there would be some impact from the disinvestment strategy. It is unlikely that changes in other prescribed items such as default rates would produce changes of that magnitude. However, based on the example in this report, a 10 bps change in rates would result in developed reserves at 95% of the prior estimates.

▪ **Change in reinvestment strategy or other components not prescribed:** Ideally, at each point in time, development of portfolio rates would be tested using the reinvestment strategy before the change and the current strategy. If investment views change, asset portfolio duration or quality may be adjusted because of current economic conditions. Changes such as these will produce similar results described in the prior paragraph albeit mitigated for consideration of the VM-20 limit regarding reinvestment return on assets (50% A/50% AA). The impact of any change in rates reduces over time. So that if the rates reduce by 10 bps five years after the initial valuation, the impact is only a 2% reduction in reserves.

▪ **Cash flow position of the block:** As noted earlier, the impact of interest rate volatility will depend on the current asset liability management (ALM) matching of the block. If a block is well matched, new investments and asset sales are less likely to occur. If new investments are occurring, returns will be dependent on the scenario. As for the term block graph in Figure 8 on page 14, after 10 years cash outflows will occur and, if assets are not cash matched, asset sales may be necessary. The ideal scenario for this block should be the mountain or increasing/decreasing scenario. That is, cash would be invested as rates are going up and sales would occur as rates are going down, which would be due to the increased market value as interest rates drop. However, the impact of asset sales should be somewhat offset if a statutory methodology is utilized where after-tax realized gains are amortized through an interest maintenance reserve (IMR).

Another issue that complicates the VM-20 process is relatively low yield curves as compared to historical averages. The NAIC defined the formula for the dynamic mean reversion point for the 20-year Treasury as the sum of:

▪ 20% of the median over the last 600 months

▪ 30% of the average over the last 120 months

▪ 50% of the average over the last 36 months

Since 80% of the formula is predicated on recent interest (last 10 years with a stronger component for the last three) and interest rates have been low over an extended period, the mean reversion target is particularly low. This has a significant impact on the AG48 calculations, particularly for ULSG given the long tail nature.

IMPLEMENTATION CHALLENGES

POTENTIAL NECESSITY OF MODEL UPGRADES AND ENHANCEMENTS

Having to deal with AG48 compliance forces companies to think about PBR implementation earlier than they may have expected. Companies in the reserve financing space have been historically producing AG38 statutory reserves alongside the ER required by reinsurance arrangements. Assumptions for ER are typically well-defined and, in particular, do not vary according to economic environments. As a result, forecasting these amounts into the future could be accomplished with customary business projection logic. Our work with companies on AG48 assignments reveals the complexities of shaping a projection system or model into one that is able to process on two paths: an outer path whereby the model is forecasting the population (of liabilities and assets) according to best estimate or baseline assumptions, and an inner path where the determination of VM-20 DR is based on other than baseline assumptions, i.e., the assumptions compliant with VM-20. Complications we have encountered and successfully addressed include:

- Highly customized model structures requiring additional logic for NPR, DR, SR, and related functions.

- Producing modeled reserve amounts compliant with AG48 requirements, while cash flow items on the reported financials continue to reflect all relevant cash flows (e.g., third-party YRT reinsurance, expense allowances, etc.). Depending on the financial terms specified in the structure of a prior transaction, the model may need to be enhanced to simultaneously calculate ER and the AM amount as well as full XXX/AXXX statutory reserves.

- Reflecting mortality improvement up to but not beyond successive future valuation nodes.

- Facilitating generation of relevant U.S. Treasury curves for future valuation nodes, to enable capture of projected net asset earnings rates.

- The ability to establish and use a grid of net asset earned rates appropriate for calculation of the DR at a future node.

RUN-TIME CONSIDERATIONS

One of the reasons run time increases dramatically in an AG48/VM-20 context is that the software is, in essence, doing a series of inner projections at each future valuation node. There is also a significant amount of run time in developing the discount rates for calculating the DR at each future valuation node. In some implementations, a different vector of discount rates is used for each future valuation node, based on best estimate assumptions up to the valuation node, and AG48/VM-20 assumptions thereafter. Each of these vectors is developed in a separate projection, increasing the run time necessary to forecast the DR.

We examined run-time impact using a couple of models to gauge it, and summarize our tests and findings in the table in Figure 12. Our analysis reflects the impact using a single processor, although typically we would anticipate these calculations would be developed using a processing grid. As such, it is more important to focus on relative differences in time rather than the absolute values we show in Figure 12.

FIGURE 12: RUN-TIME IMPACT

| Model | Approx. # Of Cells | Projection | | Run Time (Minutes) |
		Mode	Type	
Term 1	150,000	Quarterly	Statutory	5
			GPV	8
			VM-20	92
Term 2	100,000	Quarterly	Statutory	10
			VM-20	110

In Figure 12, the projections labeled "Statutory" illustrate the run time required to develop output reflecting current statutory financials. "GPV" is the run time if the projection also develops an ER that is typical of those in captive financing transactions prior to AG48. "VM-20" reflects the full reserving requirements of AG48 via an inner and outer loop process described in the previous section. As is evident, the impact on run time is rather substantial and will be even more of a factor in the calculation of the SR.

DOCUMENTATION AND AUDITABILITY

Auditability will assist documentation, and so will documentation assist auditability. Written documentation of the steps involved in model set-up, refresh process, revisions and enhancements, and assumptions will be necessary not only for continuity and meeting production deadlines, but also to inform attribution analysis. As the company moves forward with repeated AG48 calculations, attributing material changes from the last valuation period will be necessary for a complete communication to management. Initial valuations under VM-20 are a company's opportunity to establish best practices in this area. Early on, there will likely be corrections to be made in the model function and design, in the reporting, and in the analysis. In our work with companies on AG48 assignments we have provided a variety of tools to be used as audit or validation checks, whether this is cellular NPR calculation workbooks, or documentation of how the DR discount factor is generated. Our attribution analysis is helpful in explaining why the ending reserves move the way they do. Sensitivity runs, a requirement in VM-20, help to quantify changes and can be useful when future experience does not play out as assumed.

CROSS-PLATFORM ISSUES

Depending on the company and the internal systems available for developing AG48 reserves, it is possible that one system may be utilized to develop NPR while an entirely different system (or systems) would be used to calculate the DR and SR. The issue here is that the practitioner applying the AM would need to find a way for multiple systems to share results with each other. It may also lead to the need to develop an external interface, which may further complicate the process and may also exacerbate already existing run-time considerations.

HANDLING SPREAD AND DEFAULT ASSUMPTIONS

There are a number of potential company and system issues that may arise in the development of spread and default assumptions as prescribed in VM-20. Some of the considerations are listed below.

Reinvestment strategy

A company first needs to review its strategy for investing both in the current environment as well as long-term strategy. Will the strategy change as economic environment changes? Changing the strategy or using a dynamic investment strategy is a realistic approach, but some systems may be limited in their abilities to change or dynamically change strategies as economic environments change.

In addition, companies may utilize more generic reinvestment strategies (for example, AA ratings used to represent AA1, AA2, and AA3, etc.) or include alternative assets for which spreads are not prescribed; i.e., private bonds, mortgages, commercial mortgage loans (CMLs), etc.

The use of prescribed ultimate spreads and grading to ultimate spreads can also pose system issues and data issues. Some systems may not be able to change market spreads or to migrate spreads as an asset matures through the forecast. In addition, the prescribed spreads are determined over a period of time and reflect different economic environments. The reality is that Treasuries and spreads have high variances, while bond yields have a lower variance. Reflecting deterministic spreads under stochastic analysis may introduce conservative or aggressive results.

Defaults
System issues related to prescribed defaults exist as well. These include:

- Need for timely publication of NAIC-prescribed factors or the ability for companies to generate them and match previously calculated prescribed factors.

- Potential system limitations with respect to changes in default rates based on remaining life as remaining life changes through the forecast.

- Prescribed default rates for other assets. Some language is included but this may be overly conservative (i.e., private placement bonds may exhibit certain NAIC ratings but have very different recovery rates, which results in lower defaults).

- Dynamically changing default rates may also present system issues.

Scenarios
Scenario generation together with run-time considerations merit preplanning. A company whose normal asset-liability modeling process includes importing asset cash flows generated using a third-party system will require more planning up front than a company whose normal approach is to model in-force assets within the primary asset-liability model. Stochastic processes will benefit from liability model compression techniques, scenario compression techniques, and similar simplification or approximation techniques available to the company.

FORECASTED STOCHASTICS
Above, we discussed some of the complexities involved in forecasting a DR component. These same complexities compound when one considers a multi-scenario SR. An approach used for forecasting the SR component for AG48 purposes is to manually take control of the outer loop by rolling the model forward to specific (e.g. 5th, 10th, 20th, etc.) future nodes and capturing the asset and liability inforce population statistics for use in sequential projections of these inforce files over the multi-scenario SR. If the company choses to evaluate the SR at "N" future nodes, this then requires "N" separate projections, each projection over the array of scenarios used in the SR calculation. It is time and labor intensive, but does provide the company with a view of the SR at selected future nodes. Model compression techniques will come in handy in this situation.

Only recently, Milliman has developed functionality for an end-to-end scripting that processes the asset/liability model forward to a specific node according to baseline assumptions, captures appropriate in-force amounts, stages these files, and launches a stochastic valuation at that node. Using scripting, this series is repeated for as many nodes as the user chooses. It can be described as "deferred stochastic," or "stochastic on deterministic." The idea is to execute a single outer path but multiple inner paths, corresponding to the number of stochastic scenarios. The benefit of this approach is the ability to employ a full asset/liability model with appropriate interactions between assets and liabilities. Newly purchased assets and new issues can also be reflected in this process. This end-to-end scripting has been successfully performed for forecasting variable annuity reserves and it would make sense that it could be quite useful for AG48 forecasting of stochastic amounts as well.

CONCLUSION

AG48 imposes many new requirements and processes. In this paper, we have considered the impact of many of them, such as plan design, assumption determination, credibility and margins, and interest rate volatility, along with the challenges of implementing them. Actuarial practitioners need to take stock of all the considerations in order to meet the requirements presented by initiatives like AG48 but, even beyond that, the rapidly approaching implementation of full PBR.

ACKNOWLEDGEMENTS

APPENDIX: BACKGROUND OF PBR AND AG48

Principle-based reserving (PBR) has been discussed since the 1990s, although the current effort gained momentum starting in the first decade of the new millennium. The push for PBR was driven largely by the fact that the current formulaic approach does not always reflect the true underlying risks in policies, leading potentially to excessive reserve redundancy or inadequacy—in other words, a poor fit of liability to inherent risk. A key achievement of the PBR effort was the adoption in 2009 by the National Association of Insurance Commissioners (NAIC) of the statutory valuation law (SVL) allowing PBR. This SVL allowed the Valuation Manual (VM) to be revised without such changes needing to be adopted by state legislatures. The VM defines the minimum reserve and related requirements under PBR and is divided into various sections covering methodology for lines of business and the various experience, reporting, and other requirements. The VM itself was adopted by the NAIC in 2012. The next step to full implementation is state legislature approval by 42 states covering 75% of the premium written. As of July 2015, 36 states covering over 60% of premium written have approved the SVL. Should the remaining six states that have introduced legislation achieve adoption by July 1, 2016, PBR will become operative by January 1, 2017. PBR will only be required for business written on or after the implementation date.

In recent years, the insurance industry has experienced an increase in the use of reinsurance transactions to help finance certain so-called redundant reserves, often through captive insurers and alternate mechanisms. These transactions effectively fund different portions of statutory reserves using various funding solutions, such as letters of credit from a bank or a guarantee from a parent company, based on what insurers believe is the correlation between the kind of asset used and the probability that it will be needed.

The NAIC Executive Committee, concerned about such transactions, tasked the Principle-Based Reserving Implementation Task Force with assessing the solvency implications of life-insurer-owned captive insurers and alternate mechanisms. Rector & Associates, Inc. prepared a report for the task force to assist it with its charge. In Rector's report of June 4, 2014, the task force recommended a framework solution and various actions toward implementing said framework. One of the key features of this framework is the introduction of an Actuarial Method (AM), which generally implements the same underlying methodology as principle-based Valuation Manual 20 (VM-20), covering the requirements for PBR for life products. Specifically, the task force solution outlines a principle-based approach to determine limits on the kinds of assets backing certain portions of the reserves in the captive reinsurance transactions. The NAIC adopted a version of these recommendations, after several rounds of refinements based on industry feedback, as Actuarial Guideline 48 (AG48) on December 16, 2014. AG48 was intended as an interim solution to bring more uniformity to reserve financing transactions and to cover financing solutions for issues not currently being financed and subject to Regulation XXX or AXXX.

AG48 will be replaced on a state-by-state basis after the NAIC first develops and adopts amendments to the NAIC Credit for Reinsurance Model Law and a new NAIC XXX/AXXX Reinsurance Model Regulation, and then as each state adopts these models. Such legislative process has begun and probably will span the next several years. The NAIC Reinsurance Task Force has exposed for comment a proposed revision to the XXX/AXXX Credit for Reinsurance Model Regulation, including two proposed options for revisions to the Credit for Reinsurance Model Law.

As noted above, AG48 uses concepts developed for PBR to define an AM reserve. AG48 specifies particular assets ("Primary Security"), which must be used to support AM reserves and allows "Other Security" approved by the regulators to back the excess of statutory reserves over the AM reserves. Primary Securities include cash, securities listed by the NAIC's Securities Valuations Office (SVO) meeting certain requirements, and, for securities held in connection with certain reinsurance arrangements, commercial loans in good standing, policy loans, and derivatives acquired to support and hedge liabilities.

The AM reserves are intended to bring uniformity in reserve financing transactions to what previously was the ER concept, with calculations reflecting the PBR requirements as specified in VM-20. To reflect anticipated changes to VM-20 prior to PBR becoming effective, a modified version of VM-20 has been specified as the AM in AG48.

AG48 applies to policies included in reserve financing transactions after January 1, 2015, except it does not apply to policies that were part of a reinsurance arrangement, as noted in the Exemption section of AG48 as of December 31, 2014 (such as a current reserve financing facility through an affiliated captive and referred to as "grandfathered").

On a treaty-by-treaty basis, the ceding insurer's actuary must review and opine on compliance with the AG48 requirements for reserve financing transactions subject to AG48, and must issue a qualified opinion for the insurer if one or more of its reserve financing transactions is not compliant with the requirements of AG48. The ramifications of a qualified opinion are still being considered by the NAIC and the marketplace ramifications of a qualified opinion are unknown.

In addition, AG48 requires that one party to the reserve financing transaction hold appropriate risk-based capital (RBC). The NAIC is currently working on defining the specifics of how RBC will operate for such transactions.

Also, AG48 requires increased disclosure by insurers in their statutory annual financial statements with regard to reserve financing transactions for policies, whether exempted by AG48 or not. Such disclosure was required for the first time for insurers' year-end 2014 statutory annual financial statements, in a Supplemental XXX/AXXX Reinsurance Exhibit to be filed with the regulators by April 1, 2015. Insurers can expect detailed disclosure requirements going forward.

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