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Implementing VM 20

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SUMMARY

The purpose of this article is to discuss potential issues and considerations that may be encountered with the implementation of VM 20. Crucial considerations include the modeling software used, validation effort, assumptions used, complexity of the process, documentation, and run time. A key takeaway is that an integrated modeling platform with solid automation and asset-liability capabilities is imperative for addressing the issues and considerations encountered.

INTRODUCTION

In recent years, there has been growing interest in principle based reserve (PBR) requirements for life insurance products. Although not final, section VM-20 of the NAIC Valuation Manual provides guidance on the calculation of the minimum statutory reserve for life insurance products using PBR. We are moving closer to the adoption of the valuation standard, which will likely make PBR effective for all U.S. life insurance companies in 2017.

VM-20 defines the reserve as the greatest of three components, a net premium reserve (NPR), deterministic reserve (DR), and stochastic reserve (SR). The net premium reserve is a formulaic liability-only reserve calculation set under prescribed assumptions. The deterministic reserve is a gross premium valuation which uses best estimate assumptions plus a margin. The stochastic reserve is equal to the CTE 70 of the greatest present value of accumulated deficiency under prescribed scenarios, and uses best estimate assumption plus a margin. Both the stochastic and deterministic reserves include the modeling of assets. Refer to Table A for further details on VM 20.

Not only will VM 20 yield significant changes in the statutory reserve amount held, but also implementing VM 20 will present a multitude of issues and considerations for the processes and models supporting all actuarial functions (e.g., pricing, valuation, and projections).

ISSUES AND CONSIDERATIONS

Actuarial software: It is crucial to have an integrated software system which allows for the simultaneous modeling of VM 20's three main components and their complex interdependencies, and the modeling of assets with the company's investment strategy. These should be carried under one platform both at time zero and future points in time. Otherwise, one will have to resort to approximations for projecting VM 20 reserves which is needed for both pricing and forecasting. Without an as accurate as possible representation of future reserves, it is possible to misprice or not truly understand the risk profile. Therefore, the use of approximation is far from ideal.

A frequently found approach for handling PBR reserve requirements with many moving parts such as VA CARVM is to use multiple independent models for modeling the different pieces. This approach presents difficulties in validating, maintaining and reconciling the separate models and their results.

Validation: VM 20 processes will be needed for different actuarial functions such as pricing, valuation and projection. Each of these will be complex processes presenting challenges for conducting an appropriate validation effort. A successful validation will require good planning. The validation effort should be separated into two parts, the process and the results. Validating the process ensures the correct information gets transferred among the different components at any time of the projection. Validating the results is to make sure they are reasonable. An understanding of how the product features over the projection period drives the three elements (NPR, DR, SR) is crucial when assessing the reasonableness of results. It is an intensive exercise since not only each component needs to be evaluated, but also the interactions among them have to be validated. It is important that the software used allows users to track each of the three projected components. Auditability, the ability to pick a point in time, and reproduce the reserve amount is also an important feature for the modeling tool being used. Finally, comparing the IRRs, cashflows and reserve patterns under VM 20 versus those under the current statutory minimum reserve requirement (XXX/AXXX) will ensure that results are behaving as expected.

Tax Reserves: Determining the tax reserve to use for pricing and projections is something that needs to be considered. On July 31, 2015, the IRS and Treasury released their Guidance Priority List (GPL) which included a project described as "Guidance under sections 807 and 816 regarding the determination of life insurance reserves for life insurance and annuity contracts using principle-based methodologies, including stochastic reserves based on conditional tail expectation." To date, no guidance on this issue has been published. However, the listing of this project on the GPL indicates that the IRS and Treasury are actively considering guidance on the use of the VM20 reserves for tax reserving purposes. We believe that the current statutory minimum reserve requirement (XXX/AXXX), NPR or the calculated VM 20 are options that are being considered. The considerations on the use of the VM20 are related to the policy by

policy calculation requirements and the tax assumptions under IRS Section 807(d).

Required Surplus: There is no unique guidance on the required surplus to be used for life insurance products in a PBR environment. The factors for insurance risk (C2) and business risk (C4) of the current RBC formula can be applied to a reserve amount. Naturally, one would use the reported reserve, this implies that the software used needs to be able to tie to the VM 20 reserve amount at every point in time during the projection period for calculating the required capital amount. This is not a given for non-formulaic reserve methodology with many moving parts such as VM-20.

Supporting assets: Setting the starting asset requires an iterative process since the aggregate statement value of starting asset must be within two percent of the VM 20 reserve, which depends on the starting asset. The company will have to provide reasonable assurance that the reserve is not materially understated in the PBR actuarial report. To prevent this, the VM 20 reserve will have to be recalculated with the new starting asset set equal to the VM 20 reserve until it is within the two percent range. This iterative process may not present many issues for a valuation exercise since it is performed only at the valuation date. However, it will be problematic for pricing exercises where reserves are calculated at future points in time. It is important to have actuarial software that has the capabilities to handle this iterative process combined with the other calculations required under VM 20.

Considerations should also be given to the degree to which the modelled assets parallel the actual supporting asset portfolio, and the impact on results. Also, when conducting a pricing exercise, pricing metrics should be evaluated over different dimensions (e.g., gender, band, and risk class). Determining how the modelled assets should vary over the different dimensions is something that must be considered. One option is to scale the assets up or down. Another view is to have the asset distribution reflect the company's investment approach used for the pricing view being evaluated.

The above highlights that in order to appropriately capture VM20, it is essential to have an integrated modeling platform with asset-liability capabilities and investment functionalities reflecting the level of sophistication needed to model the interaction between assets and liabilities during a projection.

Assumptions: There are several items to be considered regarding the assumptions. The internal process for setting margins should be considered before implementing VM 20. Some companies do not have such a process in place yet. The capabilities

of setting margins at the individual risk level should be assessed before implementing VM 20.

The mortality used in the deterministic and stochastic components grades from the company experience into the industry's experience over a time period. Both the margin level and the grading period depend on the credibility level assessed by the company. This could result into a considerable difference in results which shows the importance of the credibility score. Other than a brief reference to the Panjer method, there is little guidance in the Valuation Manual on how to generate the credibility level. Companies will need to leverage their mortality studies and develop processes to determine the credibility of their experience.

The software used will need to have the flexibility to allow for grading the company experience to the industry mortality table over a defined period, while assigning a margin and to each of the mortality table.

Contract level allocation: For tax purposes, depending on the ultimate decision on tax reserves by the Treasury, it may be necessary to allocate the reserve at the contract level if the reserves are driven either by the deterministic or stochastic component, which are both aggregate methods. In these cases, determining

the basis for allocating the VM-20 reserve at the contract level will be a key consideration. There is little guidance on the latest draft of the valuation manual on this point. A reasonable option is to allocate over the NPR, but there are other potential alternatives, which should be evaluated.

Product Features: It is important to understand how the product features drive the behavior of the three components of VM 20 as well as the results of the deterministic and stochastic exclusion tests and ultimately the profitability of the product. To that end, an understanding of the product features contributing to passing or failing of the exclusion tests will give a better sense of the results. This will reduce the difficulty in analyzing results.

Model run time: VM 20 is calculation intensive and outputs are needed over a wide range of assumptions for pricing and projections. Consideration should be given to parameters, such as the number of projected years, which can be reduced without sacrificing the reliability of results. If the reduction in running time is not sufficient, an efficient grid, cloud, and storage solutions may be required.

VM 20 interpretation: The Company should form a shared view on the interpretation of the regulation. This will likely involve discussions with Actuarial Valuation, Accounting Policy and Tax, among others, and will drive a more focused implementation experience.

VM 20 process: VM 20 processes are complex and have many moving parts which increase model and operational risk versus the current statutory environment. This change stresses the need for efficient coding and processing, as well as a model environment with strong controls that assigns access level for users depending on his or her clearance. The modeling environment should also allow the establishment of a development, a testing, and a production environment. The modeling software used should be able to accommodate all of these. Since results will be assessed over many assumptions, the software used should also have strong automation capabilities.

Documentation: The complexity of the processes, and support for the assumptions and margins used will increase the need for documentation as reflected by the high documentation requirements in VM 20. Establishing a process that encourages efficient and comprehensive documentation will be critical for both setting the margin and creating a transparent process.

CONCLUSION

U.S. life insurers' readiness regarding VM 20 likely ranges from "I am very" to "I am absolutely not." At a minimum, VM 20 is on U.S. life insurers' radar. By thoughtfully and intentionally addressing the issues and considerations raised in this article, the likelihood of reaping the benefits of a successful implementation should improve. In particular, a careful selection of tools and techniques is important for a successful transition to the new requirements. A key takeaway is that the benefits of an integrated modeling platform with comprehensive automation and asset-liability capabilities should be considered when planning the execution of VM 20.

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TABLE A- VM20 Reserve
VM 20 = MAX (NET PREMIUM RESERVE, DETERMINISTIC RESERVE, STOCHASTIC RESERVE)

	NET PREMIUM RESERVE	DETERMINISTIC RESERVE	STOCHASTIC RESERVE
Methodology	Formula-based Similar to CRVM Seriatim required	Principles-based	Principles-based Clustering techniques allowed
Valuation basis	Net premium valuation	Gross Premium valuation	CTE 70 of the greatest PV of accumulated surplus plus starting asset under prescribed scenarios.
Assumptions	Prescribed statutory assumptions	Best estimate assumptions plus margins Margins are set according to credibility of experience and level of risk Blending of company's experienced mortality and industry table based on company's credibility level	Best estimate assumptions plus margins Margins are set according to credibility of experience and level of risk Blending of company's experienced mortality and industry table based on company's credibility level
Scenarios	Flat discount rate	Single deterministic scenario	Set of prescribed economic scenarios of yield curve and equity return rates
Discount rate	Discount rate based on issue year	projected net portfolio rates	105 percent of the projected 1-year U.S. treasury rates
Exclusion test	N/A	Pass if A>B Where: A=Sum of future guaranteed gross premiums B= Sum of future Val Net premiums and lapse rates are set to 0 percent.	Pass if test ratio<4.5 percent Where : test ratio= [(b - a) / c] a= reserve for baseline scenario b= max reserve over 16 prescribed scenarios c= total PV benefits reserve is GPV using anticipated experience with no margins