

American Academy of Actuaries Modeling Efficiency Work Group

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Agenda

1. What is MEWG and why do we exist?
2. What have we achieved?
3. Where do we go in the future?



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What is MEWG and why do we exist?



MEWG mandate

- The LFS/RM Committee recognized that some of the calculations envisioned by a PBA approach to reserves and capital can be onerous
- The purpose of the Modeling Efficiency Work Group (MEWG) is to provide information to LFS/RM, the regulators, and valuation actuaries on ways in which these calculations can be made more “efficient”
 - By efficient we mean ways in which modeling techniques and/or technology can be used to help ease the burden of huge processing requirements without affecting the accuracy of the results
 - For example, a scenario reduction technique is only “efficient” if it leads to the same result as a calculation using a larger scenario set
- Our focus is on providing information and data from which interested parties can make informed decisions. We categorically do not attempt to favor any one tool or technique over another.
 - In fact, we believe prescribing anything in this area would be inappropriate – a case of one size definitely not fitting all



Examples of modeling efficiency

■ Modeling techniques

- Traditional actuarial model building (cell compression) – Places assets and liabilities into “like” categories/buckets, and these buckets then used for valuation
- Cluster modeling – More advanced form of cell compression
- Scenario reduction – Pick a subset of scenarios from a “full” population that still adequately captures all the risk exposures
- Replicating portfolio – Find a basket of assets that mirrors the liabilities and then use this basket of assets for valuation work (usually more manageable than working with liability models)
- Proxy modeling – Fit a function (proxy) to the assets and/or liabilities and use the function for valuation work. Proving to be very effective for “nested stochastic.”

■ Technology

- Software
 - Graphics Processing Unit (“GPU”) technology
- Hardware
 - Grid



Why is modeling efficiency becoming increasingly important?

■ **Small companies**

- Smaller companies likely not to have any VA business so up to this point likely to have had no requirement for stochastic modeling
- Stochastic modeling required under VM 20 is going to have a significant impact
- Some may already be up against systems issues just doing cash-flow testing

■ **Hedge effectiveness testing**

- In order to get credit for hedging in reserves/capital under AG43/C3 Phase II need to project hedges under a variety of stresses, and ideally do it on a fully stochastic basis. Hence a “nested stochastic” or “stochastic-on-stochastic” computation, which will be very onerous if done on a “brute force” basis.

■ **ORSA**

- Projection of stat capital again potentially means a nested stochastic calculation

■ **Non-regulatory applications also create heavy computational demands**

- Internal economic capital
- Product pricing where stat reserves/capital need to be projected



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What have we achieved?



What have we achieved?

- Created bibliography of published materials regarding modeling efficiency
- Two industry surveys:
 - “Modeling Efficiency Work Group Survey – November 2007”
 - 29 participant companies.
 - 80% using model building techniques
 - 40% using “scenario design”
 - 25% using “hardware design;” 30% “software design”
 - “Usage of Modeling Efficiency Techniques in the US Life Insurance Industry” – April 2013
 - 51 participants
 - 25% using cell compression outside of traditional actuarial mapping
 - 46% of participants now indicate using scenario reduction techniques (including the Academy scenario picking tool)
 - Proxy approaches gaining popularity
- MEWG provided input and guidance on drafting “modeling efficiency” sections of VM 20
- MEWG members have also been very active in writing papers and presenting at conferences on modeling efficiency topics



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Where do we go in the future?



MEWG has reached a natural place to consider where we take the group from here

- This year's industry survey was a big milestone for us, but surveys are not typically a key function of the Academy
- There has been limited advice provided by the MEWG to regulators, and nothing in the past year since we provided our input to VM 20
- MEWG members recently voted in favour of dissolving the MEWG as an Academy work group and looking at alternative vehicles to provide a meaningful research and educational service to interested parties
 - Do the regulators see a more formal role for MEWG than what our members are now envisioning? If so, what would be our mandate?

