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It has come to the attention of the Academy's Life Capital Adequacy Subcommittee that there is a potential for an error in using the enhanced C-3 Phase I RBC interest-rate generator (not the pre-packaged interest rate scenarios) if a subset of scenarios is selected through the custom scenario feature. The problem occurs with the random numbers used to simulate the bond index returns.

Some background: The interest-rate generator is completely independent of the rest of the model. This means that the random numbers used in generating interest rates are independent (zero correlation) of all other random numbers, including those used for bond fund returns. This was a necessity, because the interest rate model is self-contained and pre-existing. The C-3 Phase II Work Group did not re-estimate parameters for the model for the C-3 Phase II RBC project (such a re-estimation was outside its scope, among other reasons).

Hence, if you are generating a custom list of scenarios, you always get the same interest rates for scenario X, because X is used to reseed the RNG at the start of each scenario. This guarantees reproducibility, irrespective of ordering.

The same is not true for bond fund returns. Specifically, the random normal samples for the bond returns *are* correlated with the random normal samples used for equity returns (and all other model components except interest rates). This was by design. Hence, the ordering of bond index return scenarios needs to be kept in line with the equity return scenarios, to preserve the intended correlation.

However, there is a potential problem in using the custom list feature. For example, if you have used the Scenario Picking Tool on the diversified large cap U.S. equity scenarios to obtain a representative set of 1,000 from the 10,000 (e.g. 2, 5, 42, 111, ..., 9990, 9997; this sequence would have 1,000 numbers), the bond index returns will use the first 1,000 random normal vectors. This will cause a misalignment in the scenario ordering.

Note that if you use the pre-packaged interest rate scenarios provided (10,000) and select subsets of the interest rates, bond returns, and equity scenarios, there isn't any problem. A revised workbook has been provided (the zipped c3generator_06.xls file at www.actuary.org/life/zip/generator06.zip). It does the following:

- Each of the readers for the random number files now tracks its own current line number. That corrects a problem in the code. Imagine that we were reading from three files of normal random numbers: For the first file, ScenNum would not equal the scenario number being generated and we would read ahead appropriately. For the second and third files, however, ScenNum would already equal the scenario number being generated (since the first file set it to this state) and the read-ahead would not occur. Having each file track its own line number resolves this issue.

- An error check has been added to ensure that the current scenario number in the file does not exceed the scenario number being generated. The only time that would become an issue is when the scenario list is not sorted in ascending order. In such instances, the generator software produces an appropriate error message.