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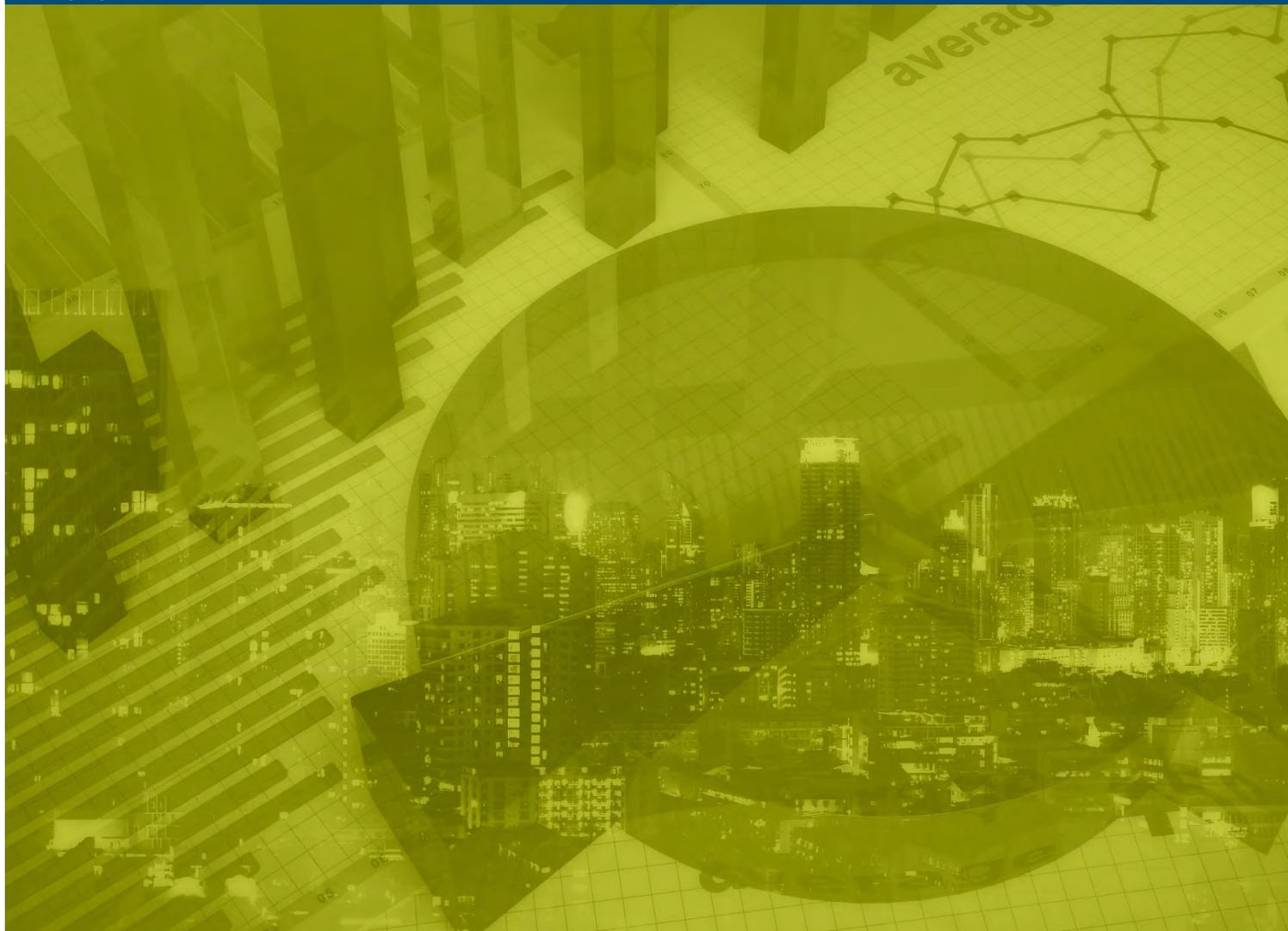
Variable Uninsured Life (Value) Annuities: Theory, Practice and Country Cases
Appendix 1: Actuarial Administration

Variable Uninsured (Value) Life Annuities

Theory, Practice and Country Cases
Appendix 1: Actuarial Administration

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Appendix 1: Actuarial Administration

Value Processing Outline

The following describes the monthly tasks required to update the Value Actuarial Administration workbook with new data and investment results. The next two sections describe the year-end tasks required to update data, mortality assumptions and benefit amounts. The monthly and annual tasks required refer to sheets in the workbook that are outlined and described at the end of this document.

Value Monthly Processing

- Input Current Period # in PARAMS
- For New Retirees
  - Input ID, COLA, Sex, DOB, DOR, BOY Balance for new retirees
  - Extend formulas down, add new rows in NewRet
- For BOY Retirees and New Retirees from prior periods
  - Input period for deaths to stop withdrawals
  - Input period for death benefit payments (enter 0 for death benefit payments in last period of prior year) and death benefit amounts; any remainder will be transferred to the longevity fund
  - If there is no death benefit payable, input same period for both stop withdrawals and death benefit payments to trigger transfer to the longevity fund
  - The period for stopping withdrawals and for making a benefit payment can be adjusted to a later month, but not to a later year
  - For joint lives where the main beneficiary has died, treat the value of the new benefit to the joint beneficiary as a death benefit to the main beneficiary
    - Set up the joint beneficiary as a new retiree with the appropriate annuity value and calculate the value of the benefit to the joint beneficiary to input as a death benefit for the main beneficiary
- InvRet
  - Input investment income amount in InvRet
- Monthbal
  - input "n" code and ID number for new retirees
  - Extend formulas down to include new retirees
- EOYRetirees
  - Extend formulas down to include new retirees

Value Year-End Processing

- Copy base mortality 1 rates into mortality history
- Enter new mortality 2 rates to calculate new annuity amounts in EOYRetirees sheet
- Run AnnFactCopy macro to generate new factors including generational improvement
- Copy latest annuity information into new column for BOY retirees in Retiree history sheet
- Copy NewRetirees Information into history sheet, move annuity information into appropriate column
- Adjust ID column in Retiree history sheet as appropriate
- Save workbook and rename new workbook for new year

Value Setup for New Year

- Update new retiree data in EOYRetirees
- Copy formulas down for new retirees added to EOYRetirees
- Copy EOYRetirees data only into BOYRetirees, paste values to avoid circular references; zero out start period for last year's new retirees that are now included in BOYRetirees
- Copy formulas in BOYRetirees down
- Zero out death benefit elected field for those already died
- Adjust ID number in BOYRetirees for new
- Enter 0 for stop withdrawal period for those who already died, including last year's new retirees
- Enter 0 for death benefits for those who already died, including last year's new retirees
- Zero out death benefit paid amounts for those who died in prior year
- Redefine BOYRet table to enable lookup function to work properly
- Delete all but one data row in NewRetirees; zero out balance and death benefit elected
- Enter prior year CPI into AssetPoolHistory and into PARAMS worksheet
- Copy values in AssetPool to AssetPoolHistory
- Copy mortality 2 rates into mortality 1 to use as current year mortality
- Run AnnFactCopy macro to generate new factors including generational improvement
- Input new BOY in PARAMS
- Input 0 for current period in PARAMS
- Input new BONY (beginning of next year) in PARAMS
- Copy formulas for New retirees to bottom on list of retirees in EOY retirees (add at least 1 new record); set formula for start period to read from NewRetirees sheet.
- Adjust Sex, DOB, DOBB, DOR in EOYRetirees for last year's new retirees that are now in BOYRetirees sheet
- Change status code in Periodbal from n to b for new retirees from past year
- Change ID number if it is a simple count in Monthbal for new retirees from past year
- Input 0 into investment income cells in InvRet

Value Excel Workbook for Actuarial Administration

The spreadsheet processes a participating uninsured longevity pool by translating retirement account balances into annuity amounts and adjusting those annuity amounts every year based on investment returns and mortality experience.

Instruction Sheets

These three sheets have instructions for processing the longevity pool each month and each year. Eventually this manual processing would be set up in a program—these instructions form the basis for code specifications for that program.

- MonthInstr
- AnnualInstr
- GenMortInstr

History Sheets

These sheets hold the history of the longevity pool showing the development of the mortality assumption, the individual benefits and the pool of assets.

- MortalityHistory
- RetireeHistory
- AssetPoolHistory

Key Processing Sheets

These sheets hold the data for each participant and look up annuity factors in the other sheets to translate account balances into annuity amounts. The PARAMS sheet holds the parameters used to do the calculations in these sheets. There are two sets of annuity factors based on the two mortality tables (see below) and two sets of improvement factors. Mortality assumption no. 1 is used for the beginning-of-year calculations and during the year. At the end of the year, mortality assumption no. 2 is used to convert the end-of-year account balances into the new annuity amounts for the next year. Then the end-of-year retiree information is copied into the BOYRetirees sheet to start the processing for the next year.

MonthBal is the sheet where investment earnings are allocated, and the impact of withdrawals, new retiree balances, death benefits etc. is determined each month. At the end of the year, any account balances forfeited on the death of participants are allocated to the participants that remain alive.

AssetInd shows the development of the account balance for the current year for a single participant. It shows the information from a single row in MonthBal in a more compact form.

- PARAMS
- BOYRetirees
- NewRetirees
- EOYRetirees
- PeriodBal
- AssetInd

Investment Return Sheets

These sheets hold the information on investment returns and the total asset pool. Each month, the total investment returns are input into InvRet and processed through AssetPool so that they can be allocated in the PeriodBal sheet.

- AssetPool
- InvRet

Annuity Factor Sheets

These sheets do the calculation and storage of annuity factors to be used in the BOY, New and EOY Retirees sheets. The contents of AnnFactGenImp are the factors generated using generational mortality improvement factors through the macro AnnFactCopy. There is a LowBal (low balance) and HighBal (version) of the annuity and other actuarial factors to enable the dynamic actuarial factors that depend on wealth or income.

- AnnFactGenImp (LowBal & HighBal)
- AnnFactCalcs
- JointMortality1
- JointMortality2

Mortality Tables and Mortality Improvement Factor Sheets

These sheets hold the mortality rate assumptions and the mortality improvements rates. The MortImp*Fact* sheets hold the factors that are calculated from the MortImp*Rate* sheets and that are applied to the base mortality rates to get the improved mortality rate to apply in a future year.

- MortTables
- MortExp
- MortImpRate1M
- MortImpRate1F
- *MortImpRate2M*
- *MortImpRate2F*
- MortImpFact1M
- MortImpFact2M
- MortImpFact1F
- MortImpFact2F

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