



AMERICAN ACADEMY *of* ACTUARIES

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July 22, 2015

Ms. Susan M. Cospers
Technical Director
Financial Accounting Standards Board
401 Merritt 7, PO Box 5116
Norwalk, CT 06856-5116
Via email to director@fasb.org and acasas@fasb.org

RE: Recent FASB Educational Sessions on Long-Duration Insurance Contracts

Dear Technical Director Cospers,

On behalf of the American Academy of Actuaries'¹ Financial Reporting Committee, I am writing to address some of the issues raised in recent Financial Accounting Standards Board (FASB) educational discussions related to the long-duration insurance contracts project.

We agree that targeted improvements to U.S. Generally Accepted Accounting Principles (GAAP) are possible and appropriate. The decisions FASB has made to date can generate important improvements, mitigating accounting mismatches and simplifying understanding of financial statements. Some approaches, however, could exacerbate mismatches and make financial statements harder to understand.

Based on our understanding of the May 21 educational session, FASB directed its staff to explore three approaches to assumption and discount rate changes for traditional long-duration insurance contract liabilities:

- Lock-in net premium ratio.
- Retrospective unlocking of net premium ratio.
- Some combination of these (e.g., lock-in net premium ratio for balance sheet and retrospective unlocking for net income, with the difference reported in other comprehensive income (OCI)).

Our comments address discount rates changes and cash flow assumption changes.

¹ The American Academy of Actuaries is an 18,500+ member professional association whose mission is to serve the public and the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

Discount Rate Changes

We are concerned that retrospectively unlocking the net premium ratio for market-based discount rate changes would produce misleading financial statements. This particular approach was briefly mentioned in the May 21 educational session and is reflected in the second and third bullets above.

In cases in which assets backing traditional insurance contracts are reported at fair value, retrospective unlocking for changes in discount rates would produce an accounting mismatch by substantially muting the effect on liabilities in comparison to the effect on asset values, even if assets and liabilities are perfectly cash flow matched.² Prospectively unlocking for discount rate changes would effectively retain the current accounting mismatch in this one respect by eliminating any immediate effect on the liability. A locked-in net premium ratio would remove much, but not all, of the volatility caused by the assumption change since the liability value change would ignore the difference between the net and gross premiums.

These differences are illustrated in the appendix and workbook included with this letter. To understand the significance of these concerns, consider the effect of a 50 basis point change in the discount rate for a company with \$100 billion of long-duration liabilities (assuming a duration of 10 years):

Even with perfect asset/liability matching, unlocking for a discount rate change would result in a \$5 billion mismatch under a prospective approach and about \$2-3 billion under the retrospective approach, depending on the maturity of the business.³ Without specifying a particular product design, the mismatch with a locked-in net premium ratio is more difficult to estimate, but would probably be less than \$1 billion.

While a \$1 billion mismatch might not significantly distort the balance sheet, it would be inappropriately large for earnings from products where the principal risks are in long-term insurance commitments. As such, we recommend an OCI approach to removing the effect of discount rate changes for most products and the assets supporting them. However, we would not recommend an approach to OCI where net income applies retrospective unlocking to discount rate changes. Such an approach would exacerbate the accounting mismatch.

In cases in which earnings reflect assets at amortized cost (including fair value through OCI (FV-OCI)), locking in the discount rate on liabilities is the only way to ensure matched accounting. Prospective unlocking for discount rate changes would essentially have the same effect at the valuation date, but would be a complicated method that produces no change.

It is not difficult to incorporate a suitable OCI approach with a locked-in net premium for discount rate changes. Below are two possible approaches:

² Retrospective unlocking would also be a mismatched accounting basis with the amortized cost basis of the assets generally reported in net income, since some of the change in liability value due to changes in interest rates would be reported.

³ This corresponds to a 40 percent to 60 percent level of maturity for the overall product portfolio, which may apply to the vast majority of companies, and probably all companies of this size. A lower maturity percentage implies a rapidly growing portfolio. A higher percentage implies a portfolio that has been substantially closed to new business for several years.

- As discussed below, unlock the net premium ratio for assumption changes (and possibly actual cash flows), but lock the net premium ratio for discount rate changes. The changes would be applied sequentially in that order, with the latter effect reported in OCI.
- Maintain two valuations: one with the discount rate locked in at the inception of the contract and a second as described in the first approach. Here, the difference between the two valuations would be reported in OCI.

Either approach would significantly improve the accounting match with available-for-sale securities reported at FV-OCI, which currently represent the vast majority of assets backing insurance liabilities. The first approach would be consistent with the calculation of liabilities for traditional long-duration contracts and limited payment contracts under existing GAAP. The second approach would be most consistent with current reporting of assets at amortized cost through net income but at fair value on the balance sheet with the difference reported in OCI. The first approach would be easier to maintain, control, and audit, but would introduce to net income the smaller distortion of liability interest accruals at current rates against investment income at original book yields.

The accounting match between assets that are not reported at FV-OCI and liabilities will not be as close. These mismatches would be less pervasive since such assets represent a smaller portion of the assets backing such liabilities. For example, even though equity securities may be appropriate investments to back traditional long-duration and limited payment contracts, they do not completely match the characteristics of these liabilities. The same could be said about real estate investments, but for real estate an OCI approach would provide as close an accounting match for net income purposes as could be achieved given a current discount rate for measuring the balance sheet liability.

There also would be an accounting mismatch on the balance sheet for amortized cost debt instruments, such as originated loans, which may be more problematic since these have a closer economic match with the characteristics of traditional long-duration and limited payment liabilities. Such mismatch may be unavoidable, given that previous FASB decisions do not permit a FV-OCI classification for originated loans. An OCI approach does provide a close accounting match with these assets for determining net income.

Given the interrelationships between interest rates and some cash flow assumptions, the first approach also would be sensitive to the order in which changes are applied. We expect that processes would be most efficient if discount rates are the last change applied in each reporting period, since it would enable other changes to be addressed before the end of the reporting period. We understand that the FASB was concerned about practical difficulties in treating cash flow assumption changes separately from discount rate changes. We do not think this is a major concern. While there can be interrelationships between cash flow assumption changes and discount rate changes (e.g., cash flow change affecting liability duration, interest sensitive lapses) for traditional long-duration and limited payment contracts, these interactions are normally second order effects.⁴ As such, final determination of order could be addressed by company policy or mandated by FASB.⁵

⁴ The situation would be somewhat different if these concepts are applied to participating life insurance contracts, and necessarily more difficult to address. For such contracts, changes in future cash flows resulting from changes in

Unlocking the Net Premium Ratio for Changes to Cash Flow Assumptions

Though a retrospective unlocking approach for changes to cash flow assumptions might ultimately provide some practical benefits, there would be significant challenges:

1. It requires maintenance of history (assumed and actual) and current accounting. However, most current valuation systems do not retain this history in sufficient detail. Thus, companies would face the dual challenge of major system changes and finding a reasonable estimate of pre-transition history.
2. The common practice of valuing traditional insurance liabilities at the individual contract level would become impractical for several reasons, some of which are explained in the footnotes.⁶ Systems designed for serial valuation would have to be replaced or substantially rewritten. Though systems of valuing universal life-type contracts might be more easily modified to effectively handle traditional contracts, many could not be done so efficiently.
3. The difficulties that financial statement users have with understanding the effects of retrospective unlocking of deferred acquisition costs (DAC) and unearned revenue liabilities on universal life-type contracts might now be seen with traditional contract liabilities.
4. In general, this would enhance consistency between traditional and universal life-type valuations, but traditional contracts would have a zero floor on the liability while similar universal life-type contracts would have an account value floor. For some products, this will be significant.
5. Liabilities for limited payment contracts will be more sensitive to assumption changes as they approach and pass their pay-up date than similarly funded universal life-type products. This difference will be greatest for products with short premium paying periods.

The first two are principally transition issues, and might be lessened with either the prospective or locked-in net premium ratio approaches. If applied consistently to traditional and universal life-type products, system maintenance after transition may be easier than current needs for two different system designs.

credited rates (including rates implicit in the dividend scale) would need to be treated consistently with the discount rate change. But this need not affect other changes to projected cash flows.

⁵ We note that the approaches we suggest for OCI are consistent with the optional OCI permitted under the International Accounting Standards Board's (IASB) decisions. A locked-in net premium ratio without OCI would be effectively consistent with the IASB's decisions to the extent that OCI is not elected. In either case, International Financial Reporting Standards (IFRS) reporters will be required to split the discount rate impact from the impact of cash flow assumptions.

⁶ To take one simplified example, consider the effect of an unexpected death claim. To apply retrospective unlocking, we would need to recalculate liabilities using a net premium ratio that takes into account the actual extra death. If, however, the valuation is performed at an individual contract level, the contract on which the unexpected claim occurred is no longer in force, and so the retrospective unlocking relating to the experience would not be reflected.

The third challenge would be different with either of the other approaches. We generally agree that unlocking with a locked-in net premium ratio would be easier to explain, but it also would result in inappropriate earnings volatility. It is unclear whether this challenge can be overcome once traditional and universal life-type products are valued similarly, and whether prospective unlocking would overcome the challenge or simply change its appearance.

The fourth and fifth challenges could be overcome with a locked-in net premium ratio, but it also would result in inappropriate volatility for most products, which would not otherwise be subject to these challenges. Prospective unlocking would substantially overcome the fourth challenge but exacerbate the fifth.

Though a locked-in net premium ratio would reduce and avoid some of the challenges of the retrospective approach, it would introduce the concern of “Day 2 gains,” as noted at the May 21 educational session. That concern is significant even beyond the reporting of such gains or losses. It would provide an incentive for companies to report favorable assumption changes as early as possible. It also would provide an incentive for companies to delay reporting of unfavorable assumption changes for as long as possible. The opportunity for Day 2 gains and the risk of Day 2 losses also would create an incentive to be as conservative as possible in the initial valuation assumptions. Reliance on auditing of assumption setting and disclosure of assumption changes may ameliorate but not necessarily eliminate this problem.

Thank you for this opportunity to provide feedback on the FASB’s long-duration project conversations. If you have any questions or would like to discuss these issues in more detail, please contact Lauren Sarper, the Academy’s senior policy analyst for risk management and financial reporting, at 202.223.8196 or sarper@actuary.org.

Sincerely,

Leonard Reback, MAAA, FSA
Chairperson, Financial Reporting Committee
Risk Management and Financial Reporting Council
American Academy of Actuaries

Appendix – Illustration of Unlocking for Discount Rate Changes

The attached spreadsheets and charts from the Financial Reporting Committee demonstrate some of the issues with changes in discount rates using hypothetical examples.

The first five pages illustrate a simple insurance product that is perfectly duration matched (Example 1). The product has annual premiums of \$1000 for six years, no expenses, and expected benefits of \$1000 payable at the end of the first five years and \$1418.50 at the end of the sixth year. \$1418.50 equals $\$1000 \times 1.06^6$, so this product can be perfectly duration matched with a zero-coupon bond earning 6 percent.

Experience in the Example 1 Base emerges as expected. Since there is no profit or loss on an expected basis, and since there are no expenses, the net premium ratio is 100 percent. Together, the insurance liability and the zero-coupon bond produce income of zero each year for six years, as appropriate, shown in income statement (I/S) columns.

The next two pages (Example 1: Rate Change – Lock In Fair Value Assets and Example 1: Rate Change – Retrospective Fair Value Assets) show the net income and balance sheet if interest rates rise to 8 percent after three years. In Example 1: Rate Change – Lock In Fair Value Assets, assets are at fair value net income (FV-NI) and the net premium ratio for the liability remains locked in when interest rates change. In Example 1: Rate Change – Retrospective Fair Value Assets, assets are also at FV-NI, and the net premium ratio is retrospectively unlocked for changes in interest rates. The rate changes for Example 1 are essentially the same as the Example 1: Base case, except there is a hypothetical I/S showing what net income would be had we predicted the change in interest rates at issue and the real I/S, which is immediately below the hypothetical income statement, showing the actual (pre-change) income in Years 1 through 3 and the catch up at the end of Year 3.

For the lock-in case, net income appropriately remains zero in all periods, as the change in liability at the end of Year 3 is exactly offset by the capital gain on the zero-coupon bond. If the net premium ratio is retrospectively unlocked, there is a large loss in year three, resulting because the unlocking partially offsets the change in liability resulting from the interest rate change but does not impact the change in asset value. Although not shown, if the net premium ratio is unlocked and assets are held at amortized cost, the realized capital gain would be zero and there would be a large net income effect in Year 3 resulting from the impact on the liability.

The various approaches are summarized in the Net Income 1 Chart. Regardless of whether assets are at FV-NI or amortized cost (which for net income would be equivalent to FV-OCI), it does not appear a meaningful income statement can result from retrospectively unlocking the net premium ratio for interest rate changes.

There are five additional pages that detail Example 2. Here, the final benefit payment is less than \$1418.50 so there is some profit in the contract and the net premium ratio is less than 100 percent. Even a net premium lock-in with perfectly duration matched assets does not avoid some confusion in net income from the interest rate change. That is because, effectively, we have more assets than we need to duration match. To manage around that, we would need to maintain a perfect balance of FV-NI assets and FV-OCI (or amortized cost) assets that would be rebalanced each period. Since the asset classification is typically locked in, this does not seem practical. The most practical solution is to permit OCI for the liability along the lines of the exposure draft (i.e., using a locked-in discount rate for net income and a current rate for balance sheet).

Example 1: Base

Interest Rate 6%

| Liability cash flow | |
|---------------------|--------------|
| BOY Gross Premium | EOY Benefits |
| 1 | 1000.0 |
| 2 | 1000.0 |
| 3 | 1000.0 |
| 4 | 1000.0 |
| 5 | 1000.0 |
| 6 | 1000.0 |
| | 1418.5 |
| | 5212.4 |

Net Premium Ratio 100%

| Asset value | NII | URCG |
|-------------|--------|------|
| 0 | 1000.0 | |
| 1 | 60.0 | 60.0 |
| 2 | 123.6 | 63.6 |
| 3 | 191.0 | 67.4 |
| 4 | 262.5 | 71.5 |
| 5 | 338.2 | 75.7 |
| 6 | 0.0 | 80.3 |

| Reserve | |
|----------|---------|
| Net Prem | Reserve |
| 0 | 1000.0 |
| 1 | 1000.0 |
| 2 | 1000.0 |
| 3 | 1000.0 |
| 4 | 1000.0 |
| 5 | 1000.0 |
| 6 | 0.0 |

| B/S | | |
|--------|-----------|---------|
| Assets | Liability | Surplus |
| 0 | 1000.0 | 1000.0 |
| 1 | 60.0 | 60.0 |
| 2 | 123.6 | 123.6 |
| 3 | 191.0 | 191.0 |
| 4 | 262.5 | 262.5 |
| 5 | 338.2 | 338.2 |
| 6 | 0.0 | 0.0 |

| I/S | | | | | |
|---------|--------|------|---------|---------|------------|
| Premium | NII | URCG | Benefit | Chg Res | Net Income |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 60.0 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 63.6 |
| 3 | 1000.0 | 67.4 | 0.0 | 1000.0 | 67.4 |
| 4 | 1000.0 | 71.5 | 0.0 | 1000.0 | 71.5 |
| 5 | 1000.0 | 75.7 | 0.0 | 1000.0 | 75.7 |
| 6 | 1000.0 | 80.3 | 0.0 | 1418.5 | -338.2 |

Initial Interest Rate **6%**
 Interest Rate EOY 3 8% Rate change at EOY immediately before benefit payment

| Liability cash flow | | Asset value | NII | URCG |
|---------------------|--------------|-------------|--------|-------|
| BOY Gross Premium | EOY Benefits | 0 | 1000.0 | |
| 1 | 1000.0 | 1 | 60.0 | 60.0 |
| 2 | 1000.0 | 2 | 123.6 | 63.6 |
| 3 | 1000.0 | 3 | 126.1 | 67.4 |
| 4 | 1000.0 | 4 | 216.2 | 90.1 |
| 5 | 1000.0 | 5 | 313.4 | 97.3 |
| 6 | 1000.0 | 6 | 0.0 | 105.1 |

5170.3 5115.7

Net Premium Ratio 100%

| NPV | | | RCG factor |
|-----|-------------|-------------|------------|
| 1 | 1000 | 943.3962264 | |
| 2 | 943.3962264 | 889.99644 | |
| 3 | 889.99644 | 839.619283 | 3 |
| 4 | 839.619283 | 777.4252621 | 0.945467 |
| 5 | 777.4252621 | 719.8382056 | |
| 6 | 719.8382056 | 945.4669004 | |

Example 1: Rate Change - Lock In Fair Value Assets

| Reserve recalculation | | | Hypothetical B/S | | |
|-----------------------|---------|-------|------------------|-----------|---------|
| Net Prem | Reserve | | Assets | Liability | Surplus |
| 0 | 1000.0 | 945.5 | 0 | 1000.0 | 945.5 |
| 1 | 1000.0 | 2.2 | 1 | 60.0 | 2.2 |
| 2 | 1000.0 | 62.3 | 2 | 123.6 | 62.3 |
| 3 | 1000.0 | 126.1 | 3 | 126.1 | 126.1 |
| 4 | 1000.0 | 216.2 | 4 | 216.2 | 216.2 |
| 5 | 1000.0 | 313.4 | 5 | 313.4 | 313.4 |
| 6 | 0.0 | 0.0 | 6 | 0.0 | 0.0 |

| Hypothetical I/S | | | | | | |
|------------------|--------|-------|---------|---------|------------|-------|
| Premium | NII | URCG | Benefit | Chg Res | Net Income | |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 2.2 | 57.8 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 60.1 | 3.5 |
| 3 | 1000.0 | 67.4 | -64.9 | 1000.0 | 63.7 | -61.3 |
| 4 | 1000.0 | 90.1 | 0.0 | 1000.0 | 90.1 | 0.0 |
| 5 | 1000.0 | 97.3 | 0.0 | 1000.0 | 97.3 | 0.0 |
| 6 | 1000.0 | 105.1 | 0.0 | 1418.5 | -313.4 | 0.0 |

| I/S | | | | | | |
|---------|--------|-------|---------|---------|------------|-----|
| Premium | NII | URCG | Benefit | Chg Res | Net Income | |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 60.0 | 0.0 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 63.6 | 0.0 |
| 3 | 1000.0 | 67.4 | -64.9 | 1000.0 | 2.5 | 0.0 |
| 4 | 1000.0 | 90.1 | 0.0 | 1000.0 | 90.1 | 0.0 |
| 5 | 1000.0 | 97.3 | 0.0 | 1000.0 | 97.3 | 0.0 |
| 6 | 1000.0 | 105.1 | 0.0 | 1418.5 | -313.4 | 0.0 |

Example 1: Rate Change - Retrospective Fair Value Assets

Initial Interest Rate 6%
 Interest Rate EOY 3 8% Rate change at EOY immediately before benefit payment

| Liability cash flow | | Asset value | NII | URCG |
|---------------------|--------------|-------------|-------|-------|
| BOY Gross Premium | EOY Benefits | | | |
| 1 | 1000.0 | 1000.0 | 60.0 | 60.0 |
| 2 | 1000.0 | 1000.0 | 123.6 | 63.6 |
| 3 | 1000.0 | 1000.0 | 126.1 | 67.4 |
| 4 | 1000.0 | 1000.0 | 216.2 | 90.1 |
| 5 | 1000.0 | 1000.0 | 313.4 | 97.3 |
| 6 | 1000.0 | 1418.5 | 0.0 | 105.1 |

5170.3 5115.7

Net Premium Ratio 99%

| NPV | | | RCG factor |
|-----|-------------|-------------|------------|
| 1 | 1000 | 943.3962264 | |
| 2 | 943.3962264 | 889.99644 | |
| 3 | 889.99644 | 839.619283 | 3 |
| 4 | 839.619283 | 777.4252621 | 0.945467 |
| 5 | 777.4252621 | 719.8382056 | |
| 6 | 719.8382056 | 945.4669004 | |

| Reserve recalculation | | | Hypothetical B/S | | |
|-----------------------|---------|-------|------------------|-----------|---------|
| Net Prem | Reserve | | Assets | Liability | Surplus |
| 0 | 989.5 | 989.5 | 0 | 1000.0 | 989.5 |
| 1 | 989.5 | 48.8 | 1 | 60.0 | 48.8 |
| 2 | 989.5 | 100.6 | 2 | 123.6 | 100.6 |
| 3 | 989.5 | 155.4 | 3 | 126.1 | 155.4 |
| 4 | 989.5 | 236.5 | 4 | 216.2 | 236.5 |
| 5 | 989.5 | 324.0 | 5 | 313.4 | 324.0 |
| 6 | 0.0 | 0.0 | 6 | 0.0 | 0.0 |

| Hypothetical I/S | | | | | | |
|------------------|--------|-------|---------|---------|------------|-------|
| Premium | NII | URCG | Benefit | Chg Res | Net Income | |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 48.8 | 11.2 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 51.7 | 11.9 |
| 3 | 1000.0 | 67.4 | -64.9 | 1000.0 | 54.9 | -52.4 |
| 4 | 1000.0 | 90.1 | 0.0 | 1000.0 | 81.0 | 9.0 |
| 5 | 1000.0 | 97.3 | 0.0 | 1000.0 | 87.5 | 9.8 |
| 6 | 1000.0 | 105.1 | 0.0 | 1418.5 | -324.0 | 10.5 |

| I/S | | | | | | |
|---------|--------|-------|---------|---------|------------|-------|
| Premium | NII | URCG | Benefit | Chg Res | Net Income | |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 60.0 | 0.0 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 63.6 | 0.0 |
| 3 | 1000.0 | 67.4 | -64.9 | 1000.0 | 31.8 | -29.4 |
| 4 | 1000.0 | 90.1 | 0.0 | 1000.0 | 81.0 | 9.0 |
| 5 | 1000.0 | 97.3 | 0.0 | 1000.0 | 87.5 | 9.8 |
| 6 | 1000.0 | 105.1 | 0.0 | 1418.5 | -324.0 | 10.5 |

Example 1: Net Income

Perfect ALM duration match; 100% initial net premium ratio



Example 1: Net Income Chart Data

| | Base | Lock In/Assets FV | Retro/Assets FV | Retro/Assets AC* |
|---|--------------|-------------------|-----------------|------------------|
| 1 | -2.27374E-13 | -2.27374E-13 | -2.27374E-13 | -2.27374E-13 |
| 2 | -2.27374E-13 | -2.27374E-13 | -2.27374E-13 | -2.27374E-13 |
| 3 | -2.27374E-13 | 1.13687E-13 | -29.35628017 | 35.59351402 |
| 4 | 0 | 0 | 9.04271814 | -12.60721326 |
| 5 | 0 | -2.27374E-13 | 9.766135591 | -11.8837958 |
| 6 | 0 | 0 | 10.54742644 | -11.10250496 |

*Amortized cost impacts have been estimated by removing the capital gain from Year 3 of the retro/asset FV scenario and assuming that amount emerges equally over Years 4-6.

Example 2: Base

Interest Rate 6% Margin 3.00%

| Liability cash flow | | | | Reserve | | B/S | | | | |
|---------------------|----------|-------------|--------|---------|----------|---------|--------|-----------|---------|-------|
| BOY Gross | EOY | Asset value | NII | URCG | Net Prem | Reserve | Assets | Liability | Surplus | |
| Premium | Benefits | 0 | 1000.0 | | 0 | 969.6 | 0 | 1000.0 | 969.6 | 30.4 |
| 1 | 1000.0 | 1000.0 | 1 | 60.0 | 60.0 | 0.0 | 1 | 60.0 | 27.8 | 32.2 |
| 2 | 1000.0 | 1000.0 | 2 | 123.6 | 63.6 | 0.0 | 2 | 123.6 | 57.3 | 66.3 |
| 3 | 1000.0 | 1000.0 | 3 | 191.0 | 67.4 | 0.0 | 3 | 191.0 | 88.6 | 102.4 |
| 4 | 1000.0 | 1000.0 | 4 | 262.5 | 71.5 | 0.0 | 4 | 262.5 | 121.7 | 140.8 |
| 5 | 1000.0 | 1000.0 | 5 | 338.2 | 75.7 | 0.0 | 5 | 338.2 | 156.8 | 181.4 |
| 6 | 1000.0 | 1194.1 | 6 | 224.5 | 80.3 | 0.0 | 6 | 224.5 | 0.0 | 224.5 |
| | 5212.4 | 5054.1 | | | | | | | | |
| Net Premium Ratio | 97% | | | | | | | | | |

| I/S | | | | | | |
|-----|---------|------|------|---------|---------|------------|
| | Premium | NII | URCG | Benefit | Chg Res | Net Income |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 27.8 | 32.2 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 29.5 | 34.1 |
| 3 | 1000.0 | 67.4 | 0.0 | 1000.0 | 31.3 | 36.2 |
| 4 | 1000.0 | 71.5 | 0.0 | 1000.0 | 33.1 | 38.3 |
| 5 | 1000.0 | 75.7 | 0.0 | 1000.0 | 35.1 | 40.6 |
| 6 | 1000.0 | 80.3 | 0.0 | 1194.1 | -156.8 | 43.1 |

Initial Interest Rate **6%** Margin **3.00%**
 Interest Rate EOY 3 **8%** Rate change at EOY immediately before benefit payment

| Liability cash flow | | Asset value | NII | URCG |
|---------------------|--------------|-------------|--------|-------|
| BOY Gross Premium | EOY Benefits | 0 | 1000.0 | |
| 1 | 1000.0 | 1 | 60.0 | 60.0 |
| 2 | 1000.0 | 2 | 123.6 | 63.6 |
| 3 | 1000.0 | 3 | 126.1 | 67.4 |
| 4 | 1000.0 | 4 | 216.2 | 90.1 |
| 5 | 1000.0 | 5 | 313.4 | 97.3 |
| 6 | 1000.0 | 6 | 224.5 | 105.1 |

5170.3 4966.1

Net Premium Ratio 97%

| NPV | | | RCG factor |
|-----|-------------|-------------|------------|
| 1 | 1000 | 943.3962264 | |
| 2 | 943.3962264 | 889.99644 | |
| 3 | 889.99644 | 839.619283 | 3 |
| 4 | 839.619283 | 777.4252621 | 0.945467 |
| 5 | 777.4252621 | 719.8382056 | |
| 6 | 719.8382056 | 795.8559838 | |

Example 2: Rate Change - Lock In Fair Value Assets

| Reserve recalculation | | | Hypothetical B/S | | |
|-----------------------|---------|-------|------------------|-----------|---------|
| Net Prem | Reserve | | Assets | Liability | Surplus |
| 0 | 969.6 | 922.5 | 0 | 1000.0 | 922.5 |
| 1 | 969.6 | -22.2 | 1 | 60.0 | -22.2 |
| 2 | 969.6 | 4.3 | 2 | 123.6 | 4.3 |
| 3 | 969.6 | 32.4 | 3 | 126.1 | 32.4 |
| 4 | 969.6 | 82.2 | 4 | 216.2 | 82.2 |
| 5 | 969.6 | 136.0 | 5 | 313.4 | 136.0 |
| 6 | 0.0 | 0.0 | 6 | 224.5 | 0.0 |

| Hypothetical I/S | | | | | | |
|------------------|--------|-------|---------|---------|------------|-------|
| Premium | NII | URCG | Benefit | Chg Res | Net Income | |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | -22.2 | 82.2 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 26.5 | 37.1 |
| 3 | 1000.0 | 67.4 | -64.9 | 1000.0 | 28.1 | -25.6 |
| 4 | 1000.0 | 90.1 | 0.0 | 1000.0 | 49.8 | 40.3 |
| 5 | 1000.0 | 97.3 | 0.0 | 1000.0 | 53.8 | 43.5 |
| 6 | 1000.0 | 105.1 | 0.0 | 1194.1 | -136.0 | 47.0 |

| I/S | | | | | | |
|---------|--------|-------|---------|---------|------------|------|
| Premium | NII | URCG | Benefit | Chg Res | Net Income | |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 27.8 | 32.2 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 29.5 | 34.1 |
| 3 | 1000.0 | 67.4 | -64.9 | 1000.0 | -24.9 | 27.4 |
| 4 | 1000.0 | 90.1 | 0.0 | 1000.0 | 49.8 | 40.3 |
| 5 | 1000.0 | 97.3 | 0.0 | 1000.0 | 53.8 | 43.5 |
| 6 | 1000.0 | 105.1 | 0.0 | 1194.1 | -136.0 | 47.0 |

Initial Interest Rate **6%** Margin **3.00%**

Interest Rate EOY 3 **8%** Rate change at EOY immediately before benefit payment

Example 2: Rate Change - Retrospective Fair Value Assets

| Liability cash flow | | Asset value | NII | URCG |
|---------------------|--------------|-------------|--------|-------|
| BOY Gross Premium | EOY Benefits | 0 | 1000.0 | |
| 1 | 1000.0 | 1 | 60.0 | 60.0 |
| 2 | 1000.0 | 2 | 123.6 | 63.6 |
| 3 | 1000.0 | 3 | 126.1 | 67.4 |
| 4 | 1000.0 | 4 | 216.2 | 90.1 |
| 5 | 1000.0 | 5 | 313.4 | 97.3 |
| 6 | 1000.0 | 6 | 224.5 | 105.1 |

5170.3 4966.1

Net Premium Ratio 96%

| NPV | | RCG factor |
|-----|-------------|-------------|
| 1 | 1000 | 943.3962264 |
| 2 | 943.3962264 | 889.99644 |
| 3 | 889.99644 | 839.619283 |
| 4 | 839.619283 | 777.4252621 |
| 5 | 777.4252621 | 719.8382056 |
| 6 | 719.8382056 | 795.8559838 |

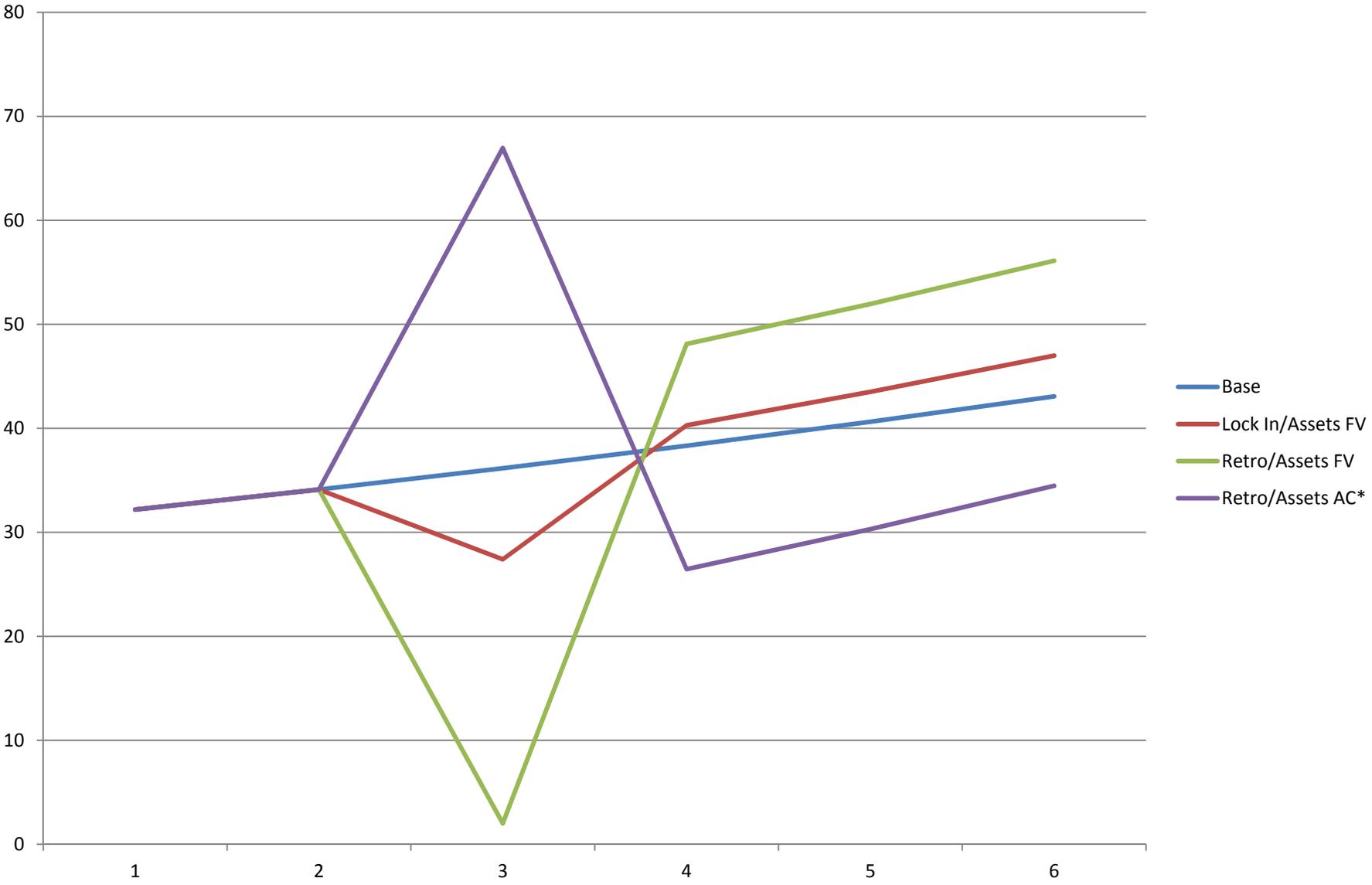
| Reserve recalculation | | | Hypothetical B/S | | |
|-----------------------|---------|-------|------------------|-----------|---------|
| Net Prem | Reserve | | Assets | Liability | Surplus |
| 0 | 960.5 | 960.5 | 0 | 1000.0 | 960.5 |
| 1 | 960.5 | 18.1 | 1 | 60.0 | 18.1 |
| 2 | 960.5 | 37.4 | 2 | 123.6 | 37.4 |
| 3 | 960.5 | 57.8 | 3 | 126.1 | 57.8 |
| 4 | 960.5 | 99.8 | 4 | 216.2 | 99.8 |
| 5 | 960.5 | 145.1 | 5 | 313.4 | 145.1 |
| 6 | 0.0 | 0.0 | 6 | 224.5 | 0.0 |

| Hypothetical I/S | | | | | | |
|------------------|--------|-------|---------|---------|------------|-------|
| Premium | NII | URCG | Benefit | Chg Res | Net Income | |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 18.1 | 41.9 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 19.2 | 44.4 |
| 3 | 1000.0 | 67.4 | -64.9 | 1000.0 | 20.4 | -17.9 |
| 4 | 1000.0 | 90.1 | 0.0 | 1000.0 | 42.0 | 48.1 |
| 5 | 1000.0 | 97.3 | 0.0 | 1000.0 | 45.3 | 52.0 |
| 6 | 1000.0 | 105.1 | 0.0 | 1194.1 | -145.1 | 56.1 |

| I/S | | | | | | |
|---------|--------|-------|---------|---------|------------|------|
| Premium | NII | URCG | Benefit | Chg Res | Net Income | |
| 1 | 1000.0 | 60.0 | 0.0 | 1000.0 | 27.8 | 32.2 |
| 2 | 1000.0 | 63.6 | 0.0 | 1000.0 | 29.5 | 34.1 |
| 3 | 1000.0 | 67.4 | -64.9 | 1000.0 | 0.5 | 2.0 |
| 4 | 1000.0 | 90.1 | 0.0 | 1000.0 | 42.0 | 48.1 |
| 5 | 1000.0 | 97.3 | 0.0 | 1000.0 | 45.3 | 52.0 |
| 6 | 1000.0 | 105.1 | 0.0 | 1194.1 | -145.1 | 56.1 |

Example 2: Net Income

Perfect ALM duration match; initial net premium ratio less than 100%



Example 2: Net Income Chart Data

| | Base | Lock In/Assets FV | Retro/Assets FV | Retro/Assets AC* |
|---|-------------|-------------------|-----------------|------------------|
| 1 | 32.18015271 | 32.18015271 | 32.18015271 | 32.18015271 |
| 2 | 34.11096187 | 34.11096187 | 34.11096187 | 34.11096187 |
| 3 | 36.15761958 | 27.40176327 | 2.002991733 | 66.95278592 |
| 4 | 38.32707676 | 40.28275563 | 48.10642848 | 26.45649708 |
| 5 | 40.62670136 | 43.50537608 | 51.95494276 | 30.30501136 |
| 6 | 43.06430344 | 46.98580617 | 56.11133818 | 34.46140678 |

*Amortized cost impacts have been estimated by removing the capital gain from Year 3 of the retro/asset FV scenario and assuming that amount emerges equally over Years 4-6.