

Society of Actuaries  
Research Project on  
Financial Reporting for Insurance Contracts  
under Possible Future International Accounting  
Standards

2011 Extension - Discount Rates, Subsequent  
Measurement of Margins, and Expenses

**Report of Findings**

March 16, 2011



Prepared by  
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# Executive Summary

In November 2010, the Society of Actuaries (SOA) released a report summarizing the results of its study on the financial reporting of insurance contracts under possible future international accounting standards. Since the publication of the November 2010 report, the SOA extended the project scope to include additional research on the treatment of discounting, expenses and subsequent measurement of margins. This report summarizes these results.

The objective of this report is to provide insight into the effects of issues currently being discussed by the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) in their effort to revise their financial reporting standards for insurance contracts. These effects are applied to selected insurance contracts (twenty year level term life insurance and long-term care insurance) illustrated in the November 2010 SOA report. The research was conducted by PricewaterhouseCoopers LLP (PwC) with the assistance of actuarial task forces (ATFs) from seven insurers, consulting firms, and accounting firms.

The results shown here should not be assumed to apply in the same manner to all insurers, even as to the selected products studied. The illustrated contracts are available in the market, and are not hypothetically derived. In most cases existing models and methodologies were either applied or adapted to develop the values shown in this paper. The investment income and overhead attributed to these contracts are based upon the ATFs' expectations.

Particular focus has been placed on the presentation of the resulting pattern of income for new business under the two reporting bases (in the IASB's Exposure Draft, *Insurance Contracts* (ED) and the FASB's subsequent Discussion Paper (DP). The issues studied relate to the treatment of discounting, expenses and subsequent measurement of margins. The principle findings include:

## Discount rates

- Based on variations in interest rates during the historical period 1993-99 and not reflecting current measurement of assets, incorporating current market-based measurement will introduce significant volatility in income. (Figure 2-1 and Table 2-1)
- To the extent that the duration of assets and liabilities aren't matched, whether credit margins are reflected or not, economic volatility will result. (Figures 2-2 and 2-3 and Tables 2-2 and 2-3)
- Even when the duration of assets and liabilities are matched, fluctuating credit spreads alone can add volatility to reported income. (Figure 2-4 and Table 2-4)
- The illustrations shown attempt to capture the effect of the volatility created by different measurement bases for assets and liabilities, indicating the need to isolate the effect of the resulting income volatility.

## Expenses

- To the extent that initial acquisition costs are not included in expected cash flows, the unit of account (e.g., contract, successful sale, and portfolio) can significantly affect the amount of acquisition costs considered incremental and thus the initial loss for a portfolio of insurance contracts. (Figures 3-1 through 3-5)
- To the extent that the timing of overhead is not consistent with the amortization of the margin, inclusion of overhead costs as expected cash flows can affect the liability after issue and subsequent margin release. (Figures 3-6 through 3-10)
- Allocation of overhead costs to initial contract recognition can affect subsequent measurement of the liability of insurance contracts. Although, unless large in proportion to initial acquisition cost, the affect may not be significant. (Figures 3-11 through 3-13)

### Subsequent measurement of margins

- In longer duration contracts, accretion of interest on the margin balance can increase the outstanding balance significantly and defer income recognition, particularly with steeply sloping claim/benefit rates and low lapse rates. (Figures 4-1 through 4-4)
- Selection of the base over which amortization of initial margin is determined can significantly affect the subsequent size of liabilities and resultant income. In longer duration contracts with increasing claim/benefit rates, liabilities will be greater and resulting income deferred if an alternative approach is used, e.g., face amount of life insurance or release from risk. (Figures 4-1 through 4-6)
- Although prospective remeasurement of margins recognizes the effect of actual experience / current changes in estimation on a cumulative catch-up basis, this effect in the current period can be smaller than for non-remeasurement. (Figures 4-7 through 4-12)

# 1 Background

An international financial reporting system for insurance contracts has been under development for the last fourteen years, first by the International Accounting Standards Committee and then the International Accounting Standards Board (IASB). In October 2008 the Financial Accounting Standards Board (FASB) joined the IASB in discussing the issues associated with accounting for insurance contracts, making it a joint project. These discussions reflected comments provided in response to the 2007 DP. As a result of these discussions, an Exposure Draft (ED) was published by the IASB on July 30, 2010 and the FASB distributed a Discussion Paper (DP) on September 17, 2010 that wrapped the ED and included a discussion of its current views.

In an effort to better understand the potential effect of the proposed accounting model described in the IASB's ED and variations expressed by the views of the FASB as indicated in its DP, the American Academy of Actuaries (AAA) asked the Society of Actuaries (SOA) to conduct research that incorporates modelling of new business to illustrate the expected effects of the ED and DP on life and health insurance and annuity contracts commonly offered by U.S. insurers. The SOA commissioned PwC to conduct a research study to meet that objective.

The Society of Actuaries (SOA), in a research paper dated November 24, 2010, entitled "Research Project on Financial Reporting for Insurance Contracts under Possible Future International Accounting Standards, Modelling of Certain Life and Health Insurance and Annuity Products Offered by U.S. and Other Insurers for the Purpose of Measurement of Liabilities under the International Accounting Standards Board's Exposure Draft on Insurance Contracts and U.S. GAAP" (November 2010 SOA report), assessed the effect of the ED and DP on various life, health and annuity contracts.

The American Academy of Actuaries (AAA), the organization that represents the actuarial profession on public policy issues and professionalism in the United States, has been closely monitoring the results from this project. The Society of Actuaries (SOA) has been providing research with respect to these developments.

*The opinions expressed and findings reached by the researchers are their own and do not represent any official position or opinion of the SOA or its members, the AAA, members of the Actuarial Task Forces (ATFs) involved, or PricewaterhouseCoopers (PwC).*

## 1.1 Purpose of this Paper

This report extends the November 2010 SOA report, by examining the effect on certain of these contracts to alternatives that have been discussed in treatment of discounting, expenses and subsequent measurement of margins. It was developed as a result of a desire to further explore, through the use of modelling performed a year ago, several issues that have arisen with respect to the proposals.

The focus of this research is the development of baseline illustrative financial statement results using the financial reporting models proposed in the IASB's ED and the FASB's DP on the treatment of three aspects of the proposals, addressed in the indicated sections of this report:

1. Discounting (Section 2 of this report). The proposed use of current measurement of interest rates to be used as a basis for discounting has been extensively discussed, particularly with respect to its resultant volatility in income. The variation in U.S. interest rates during one historical period (1993-99) was applied to the measurement of the liability of a portfolio of insurance contracts to identify the extent of such variability, including the effect of possible offsets from the measurement of assets (with and without credit spread).
2. Expenses (Section 3). The extent of insurer expenses that should be included in the measurement of expected cash flows of insurance contracts (building block 1) has been a contentious issue. The effect of alternative levels of initial acquisition costs (due to differences in the method of acquiring a portfolio of insurance contracts, or to inclusion of the cost of unsuccessful sales efforts) and indirect or overhead costs are illustrated.

3. Subsequent measurement of margins (Section 4). There are several possible approaches to measure the residual or composite margin, particularly because of the nature of these margins (a composite of many factors that would be impractical to match in the aggregate). The results using several approaches are shown, focusing on whether to use exposures to risk (e.g., inforce face amount) or actual/expected incurred benefits (e.g., death or health related benefits), whether to accrete with interest, and whether to remeasure or to be locked in at issue.

## **1.2 Key Aspects of the SOA Project**

The following sections describe the process followed in the course of the research conducted and the products modelled. By necessity, PwC developed certain assumptions regarding the application of the current proposals and the issues currently under discussion.

### **1.2.1 ATFs and the Researcher**

To conduct this project, actuarial task forces (ATFs) consisting of life and health actuarial volunteers were formed. These were composed of individuals from insurance companies, consulting firms, and accounting firms who either currently offer the products studied or whose clients do. Each product was modelled by at least one ATF. In addition, in some cases more than one ATF came from a single insurer or firm. Consulting and accounting firms whose actuaries served as ATFs are recognized in the Acknowledgement section above; participating insurers are not listed due to a concern for confidentiality of their information.

The research was conducted and this paper was prepared by PwC actuaries Sam Gutterman and Randy Tillis, Fellows of the SOA (FSAs) and Members of the AAA (MAAAs).

### **1.2.2 Process Followed**

Results were developed for new business only. The projection period studied was for contracts issued on average on December 31, 2009. ATFs provided underlying cash flows, baseline income statements and balance sheets applying the ED proposal (described in Section 1.4), certain alternatives to the ED results including both ED and DP proposals (described in Sections 2 through 4) where appropriate.

The results shown in this report have been adjusted or otherwise altered in a way to preserve the substance of the results, yet at the same time protect company-specific data confidentiality.

The baseline ED cash flows were either based on a single set of expected cash flows or were based on probability weighting (i.e., the results used the weighted average of a number of scenarios). For some of the alternative results, the alternative cash flows were provided by the ATFs, while in other cases the researchers prepared them. The researchers provided the discount rates to be used and ensured that the rates were applied consistently by the ATFs.

For income statement projection purposes for the products modelled in this research extension, actual investment income was generated from the amount underlying the net liability (liability less deferred acquisition cost (DAC) asset) according to U.S. GAAP in the base case. In actuality, reported investment income in an income statement for such contracts would be generated from the amount allocated to the contracts' liability from the entity's general account, including generated surplus. As the objective of this project is to assess the effect of alternatives from the ED on the contracts studied, it was decided to use U.S. GAAP net assets as a common base from which to determine the investment income, for all assessments. This approach reduces the noise that would have resulted if different amounts of investment income had been included, although it does not reflect an actual indication of the investment income likely to directly arise from the cash flows generated by the contracts. This approach does not affect the measurement of the liabilities themselves, although it does affect the income attributed to the contracts.

In performing the analysis, all results were determined on a pre-income tax basis, consistent with applicable IFRSs. Taxes not based on income, such as premium taxes and modelled taxes (e.g.,

payroll tax), are reflected as allocated expenses in both expected cash flows and actual expenses, as applicable.

Because the new business models used assume all products are sold either on or on average on December 31, 2009, liabilities reported as of each calendar yearend are represented by their liabilities at the end of each contract year (normally, a mean or mid-terminal liability method would be used). For simplicity, contracts were assumed to be written on an annual mode of premium. The modelled business reflects the population chosen by the ATF which may be a single cell or model point, or a variety of plan types and model points.

The projection period shown is generally thirty years although most of the ATFs determined their expected cash flows over the expected lifetime of the modelled contracts.

### **1.2.3 Model Validation**

Prior to using the results provided by each of the product-level ATFs, baseline results were reviewed at a high level by the PwC researchers for reasonableness, including U.S. GAAP implied lapse rates, mortality/morbidity rates, expenses, and interest rates. In addition, the cash flows themselves were reviewed at a high level. Each ATF was also asked to describe the validation methods they used to gain comfort with their model output. The reasonableness of the model results was also discussed extensively with members of the project's Project Oversight Group (POG).

Note that the results have not been subject to audit, except to the extent that U.S. GAAP values submitted are those actually used by the entities; however, even in this case an audit may not have been conducted at the unit of measurement provided. Nevertheless, the outputs provided were developed primarily from actual models in use internally by the ATFs, usually for cash flow testing, pricing, or financial reporting purposes. However, ultimate reliance for data accuracy and cash flow modelling has been placed on the ATFs.

### **1.2.4 Products Modelled**

In this report, the contracts studied are actual products sold (not theoretically constructed just for this project), reflecting a mix of risk characteristics that overall represent the business written (for example, by age, gender, and risk classification). A brief description of the general characteristics of the two products studied here follows. Both are sold to individuals and do not have cash surrender values.

1. Term life insurance (Term). Premiums for the portfolio of the Term contracts studied here are level for twenty years; after the initial twenty year term period, their premiums annually increase. Because of the significant increase in premiums in the twenty-first contract year, all of which are guaranteed, a significant lapse rate is expected at that time. As a result, the expected death benefits and premiums peak in the twentieth contract year. The face amount (sum assured) is level for the period of coverage. Their conversion option to other forms of life insurance was not modelled as part of this project. This is a very common product issued in the U.S.
2. Long-term care insurance (LTC). Premiums for the portfolio of LTC contracts studied here are level for life and are guaranteed renewable, that is, the contract boundary includes the entire expected coverage period, unless the insurer files for and receives approval from a regulator for a change in premium rates. These contracts provide various assisted living benefits, predominantly for reimbursement of nursing home and home health care providers. The liability and income reflects both the pre-claims and claims period. It has a very steep expected cost curve (increasing significantly beginning at about age 80 or 85) and a low rate of voluntary policyholder terminations.



### 1.3 Study Limitations

The resulting liability measurement included in this project is quite dependent on the specific markets, underwriting, product designs, competitive pricing levels, and efficiency of the portfolios modelled. As a result, although the products modelled by the ATFs represent typical products offered by U.S. life and health insurers, it would be inappropriate to assume that the income and balance sheet values shown in this report would be the same as those that would be generated by the U.S. insurance industry as a whole or to a particular insurer's contracts.

Existing models and methodologies used were either applied or adapted to the ATFs' views of how they would apply these existing models to produce values that reflect the ED proposals, along with the alternatives in the proposals addressed here. These were based on both the instructions provided by the researcher and through reading the ED and DP. Since the underlying cash flows were in most cases derived using existing financial reporting, pricing, or financial projection software, the results shown may differ from what insurers would have derived if their models had been developed from scratch to meet the specifications of this study.

Several additional limitations of this study apply and should be kept in mind:

- Asset valuation and total cash flows generated by these products have not been modeled. The amounts of total assets assigned to these contracts are equal to the amount of the U.S. GAAP liabilities net of corresponding outstanding deferred acquisition cost (DAC) asset. This approach was taken to increase the comparability of income statement values shown under the alternatives studied.
- The ATFs that conducted the modeling attempted to measure probability-weighted cash flows. However, because of practical limitations, deterministically-derived expected value assumptions were primarily used. Thus, to the extent that options and guarantees were not specifically modeled, liabilities may be somewhat understated in comparison with the overall expected cash flows.
- Current expectations as of a particular point in time, at December 31, 2009 for the risk-free rates, were applied that may not be indicative of the conditions or expectations of future financial markets or competitive situations at any other point in time. For example, the short-term interest rate scenario at that time is quite low relative to historical experience.
- Except where noted, actual results subsequent to December 31, 2009 are set equal to those expected on that date. Although useful for illustration purposes, subsequent development will rarely, if ever, equal that expected. For example, as U.S. government securities continue to be issued and traded, discount rates will change daily. As a result, the amounts of income shown may be smoother than what can be expected to occur in reality.
- Although every attempt was made to apply the IASB's views as indicated in the ED, in certain areas deviations were intentionally applied, either because they did not significantly affect the results shown, relevant information was difficult to obtain, practical expediency was warranted to produce this report in a timely manner, or where detailed application guidance was not available.

### 1.4 Baseline Exposure Draft Approach

To assess the potential effect of the proposals that have been made, the ATFs were asked to determine baseline IFRS values reflecting the proposals in the ED and DP. A consistent baseline approach for all products for IFRS reporting illustrations was applied. The fulfillment value approach was used to derive IFRS income statements and balance sheets, with risk adjustments calculated using a cost of capital approach more fully described in the November 2010 SOA report.

Under this approach, liabilities are calculated as the discounted expected value of contractual cash flows. The opening balance date was January 1, 2010, with the discount rates used equal to (smoothed) spot rates of U.S. government securities at December 31, 2009 unless otherwise indicated.

The investment income earned under the ED proposal shown in this report is based on that expected to be earned under the assets corresponding to net U.S. GAAP liabilities (liabilities less outstanding DAC balance). Thus, the actual investment experience shown in various figures in the following sections showing income are consistent with each other. Alternatively, the investment income returns could have been generated from assets corresponding to the applicable set of net liabilities, generated from market-based yield curves applicable to each proposal or accounting standard. This may have produced different levels of total income related due solely to the investment income, which could have distorted the comparison of results.

The basis for measurement is a fulfillment value notion, described as the present value of the cash inflows (including premiums) and outflows (including benefits, claims, and expenses) within the contract boundaries that arise as the insurer fulfills its net obligations and rights under the insurance contracts. It does that through the use of four building blocks: (1) the expected cash flows within the contract boundaries, which would exclude any unbundled components, (2) the discount of these cash flows reflecting the time values of money, (3) an adjustment for risk, and (4) a residual margin run off over time whose purpose is to avoid a gain at initial recognition of the insurance contract. The DP combines blocks 3 and 4 into a composite margin. The following briefly describes liability measurement in terms of these blocks. For a more indepth description, refer to the November 2010 SOA report.

#### **1.4.1 Expected Cash Flows**

In most cases expected cash flows were based on mean or expected values based on the ATFs' current estimates of experience, consistent with the intent of the ED proposal as discussed in B39 of the ED. Acquisition costs included in the expected cash flows in the liability measurement are based on those incremental to the contract, that is, primarily consisting of compensation to agents or brokers. Any additional acquisition costs were recognized as an immediate loss. The relative percentage of incremental to the contract acquisition costs compared to the total acquisition costs vary widely by ATF.

Renewal expenses included direct maintenance and other direct expenses, but did not include non-allocated overhead. Again, the percent of these total costs included in the expected cash flows varied widely by ATF.

#### **1.4.2 Discount Rates and Investment Income**

Interest rates used in the determination of discount rates were based on the yield curve underlying the spot rates derived from reported prices of U.S. government securities traded on December 31, 2009, somewhat smoothed to eliminate certain discontinuities in the resulting yield curve. An (il)liquidity (often referred to as a 'liquidity premium' or 'liquidity adjustment') adjustment of 73 basis points, due to the differences in the relative effect of policyholder behavior on the liquidity characteristics of these products, was also included.

An income statement (statement of comprehensive income) includes actual investment income. To determine how much actual investment income should be included, a level of assets had to be assigned. An amount equal to the net U.S. GAAP liabilities (liabilities less outstanding DAC balance) for the base case was used.

#### **1.4.3 Risk Adjustment**

Risk adjustments for the baseline IASB ED results were calculated using a relatively simple cost of capital approach. It reflects an estimate of the cost of maintaining a sufficient amount of economic capital without which the insurer might be unable to fulfill its obligations and the policyholders would be likely to surrender their insurance contracts.

A 6% cost of capital rate was used in the cost of capital method. The factors used are generally consistent with 200% of NAIC Risk Based Capital (RBC). Although it is recognized that theory and practice will evolve to use other methods or assumptions in the future, this approach to risk adjustment was selected in part as a practical expedient.

The resultant risk adjustment resulting from the factors used are relatively small. This may be due in part to the approximations applied here or inadequate reflection of policyholder behavior or calamity risks, but is reflective of the fact that investment and asset/liability mismatch risk is not reflected in the risk adjustment factor.

#### **1.4.4 Residual Margin (IASB ED) and Composite Margin (FASB DP)**

The residual margin eliminates any gain at inception of insurance contracts determined on the basis of the first three building blocks. It arises at issue when the expected present value of the future cash outflows plus the risk adjustment is less than the expected present value of the future cash inflows. It cannot be negative and is determined on a portfolio basis. Subsequent to the beginning of the coverage period, it is run off in a systematic way over the coverage period that reflects the exposure from providing insurance coverages not on the basis of the passage of time, but on the basis of the expected timing of incurred claims and benefits (when that pattern differs significantly from the passage of time). For most life and health insurance contracts, this pattern does differ significantly from the passage of time. The ED indicates that the residual margin accretes with interest, which can lead to an increase in the margin balance after issue depending on the incidence of benefits. This negative amortization is a function of the small initial amount of benefits relative to the interest credited during this period.

The composite margin, in the alternative measurement approach described in the FASB DP, also eliminates any gain at inception of the contract determined on the basis of the first two building blocks. It is equal at the inception of the insurance contract to the sum of the risk adjustment and the residual margin, and cannot be negative. The amortization of this margin is determined in a dynamic manner, reflecting actual cash flows over both the coverage period and the claims period, if applicable, as well as updated estimates at each reporting date. Nominal values (i.e., no present values) are reflected, without interest accretion, according to the following formula:

$$\frac{(\text{premiums allocated to date} + \text{claims and benefits paid to date})}{(\text{total expected premiums from issue} + \text{total expected claims and benefits from issue})}$$

## 2 Discounting

The objective of this section is to illustrate the effect on income and balance sheet values of alternative approaches to discounting, in particular to the effect of deviation between actual and expected yield curves. It examines this as it affects term life insurance contracts.

To capture the effect of variations in interest rates we look at 6 years of financial statement results based on cash flows provided by the ATFs. We then create year by year income and balance sheets replacing projected interest experience with 'actual'. All other cash flows and assumptions are unchanged to capture the effect of the changing yield curve.

We selected the variation in historical rates from 1993-1999 to be the basis for our analysis as it was a period during which both increases and decreases in the level of the yield curve occurred. We applied the relative variation in these rates to the expected 2010 experience base (if we had applied the actual 1993-99 rates directly the relative size of the current estimates and residual margin would have been significantly affected). More details on these rates are given in the Section 2-Appendix. The yield curves for each year end were used to derive the discount rates required to recalculate the current estimate (CE) liability and the risk adjustment (RA). These revised results are labelled 'Actual' or '93-99 Historical', whereas the original IASB ED results are referred to as 'Original' or '1993 Base'.

For this process we have 'locked-in' the discount rate applied to the residual margin. Note that a composite margin is not affected by changes in discount rates and thus its amortization is not affected by a changing interest rate environment. Consequently we have shown only the IASB ED results in this section.

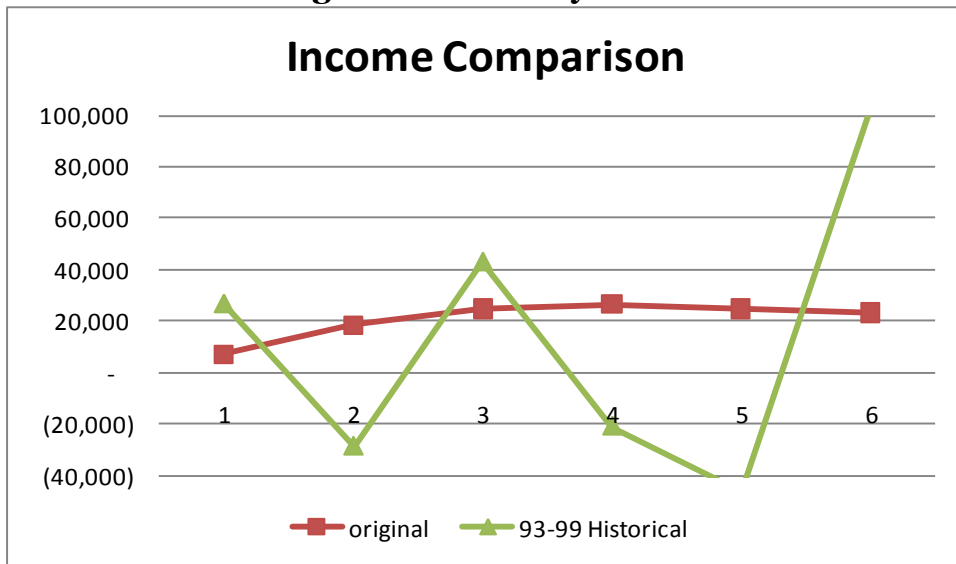
### 2.1 Effects of change in discount rates -- liability only

In the first set of results illustrated we did not change the investment income in the cash flow projections. It may be argued that in a changing interest rate environment the investment income earned will depend on how the investment portfolio is constructed and the rate that investments roll over or are traded. However, as a starting point, we did not reflect this refinement.

Figure 2-1 and Table 2-1 show the liability pattern for the first 6 years under the original projection used in the November 2010 SOA report based on December 31, 2009 rates '1993 Base' results and that achieved following the process described below for the '93-99 historical' results. This assumes that actual investment returns after 2009 follow the historical yield curve changes in effect after 1993. The '1993-99' values reflect this historical volatility in interest rates as the current estimates are made. Note the swings in the current estimate and risk adjustment shown in Table 2-1 only reflect the changes related to discounting. No changes in investment income or cash flows were made. The end of year values are based on the rates in effect during this period as described above and are illustrative of the historical volatility in the yield curves.

The change in liabilities shown Table 2-1 is the amount that would impact income. The income effect illustrates the difference from the original expected income pattern. Figure 2-1 compares income according to the baseline ED ('1993 Base') to the adjusted 'historical 1993-99' IASB income.

**Figure 2-1 Liability effect**



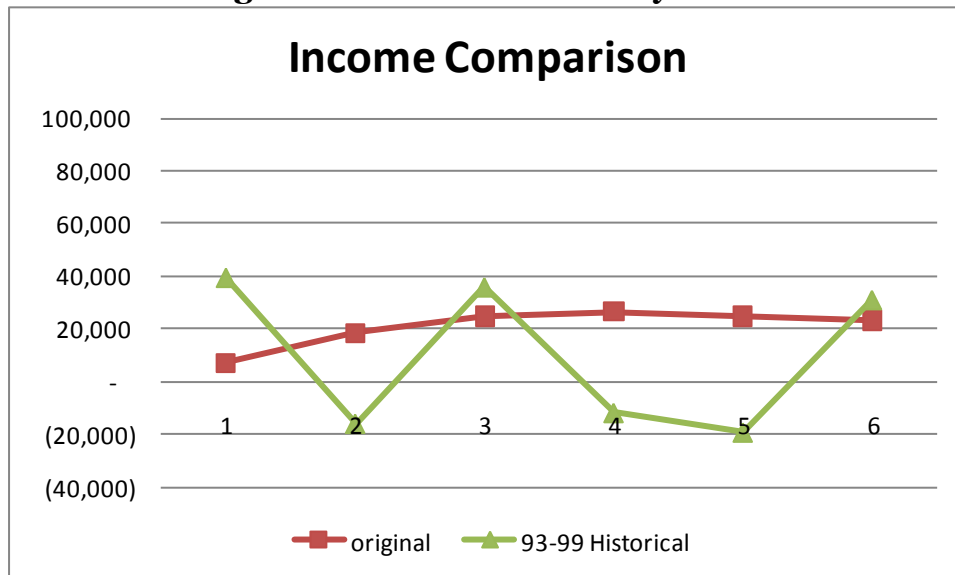
**Table 2-1 Liability effect**

	time 0	time 1	time 2	time 3	time 4	time 5	time 6
<b>Original</b>							
CE	525,875	628,663	432,430	232,606	53,216	(109,348)	(256,011)
RA	83,054	75,326	69,103	63,760	59,221	55,334	51,782
RM	442,821	438,088	436,195	435,607	437,710	441,959	445,975
Liability	-	(115,249)	72,869	266,761	443,715	606,640	753,769
<b>"ACTUAL"</b>							
CE	525,875	641,381	409,095	226,203	1,553	(228,100)	(302,479)
RA	83,054	68,667	73,600	67,117	64,891	64,810	55,489
RM	442,821	438,088	436,195	435,607	437,710	441,959	445,975
Liability	-	(134,626)	100,700	276,520	501,048	734,868	803,943
<b>Income effect</b>		19,377	(47,209)	18,072	(47,574)	(70,895)	78,054
Cumulative		19,377	(27,832)	(9,760)	(57,333)	(128,228)	(50,174)
Reserve change	original	(115,249)	188,117	193,892	176,954	162,925	147,129
	actual	(134,626)	235,327	175,820	224,528	233,820	69,075
	delta	19,377	(47,209)	18,072	(47,574)	(70,895)	78,054
Reserve change	% of original	-17%	-25%	9%	-27%	-44%	53%
Liability Actual/Original		117%	138%	104%	113%	121%	107%
Income	GAAP	18,927	35,442	36,219	38,322	39,916	41,303
	original	7,189	18,378	24,806	26,523	24,704	23,201
	actual	26,566	(28,832)	42,878	(21,050)	(46,191)	101,255

## 2.2 Effects of change in discount rates -- asset and liability

The second set of results also reflects the effect of changes in interest rates on asset measurement using the same historical period during which the change in market values related to the yield curve is derived and credit spread changes. This analysis was performed using a proxy asset portfolio, as the ATFs were not asked to provide actual asset portfolio information. The liability results are unchanged, but there is an adjustment to income as the changes in the market value of assets component are now reflected. The following simplified approach was used to determine the asset portfolio mix and credit spreads on the assets. Assets were assumed to be corporate A rated bonds with a distribution of 20% 2 years, 20% 5 years, 50% 10 years and 10% 20 years to maturity. This weighting was also used to derive the portfolio duration against which the change in market value of assets was measured. The illustrations reflect the volatility during 1993-1999, consistent with the changing yields used in the liability calculations. Figure 2-2 and Table 2-2 show the effect of the change in asset valuation if the bonds are measured on a fair value basis to income.

**Figure 2-2 Asset and liability effect**

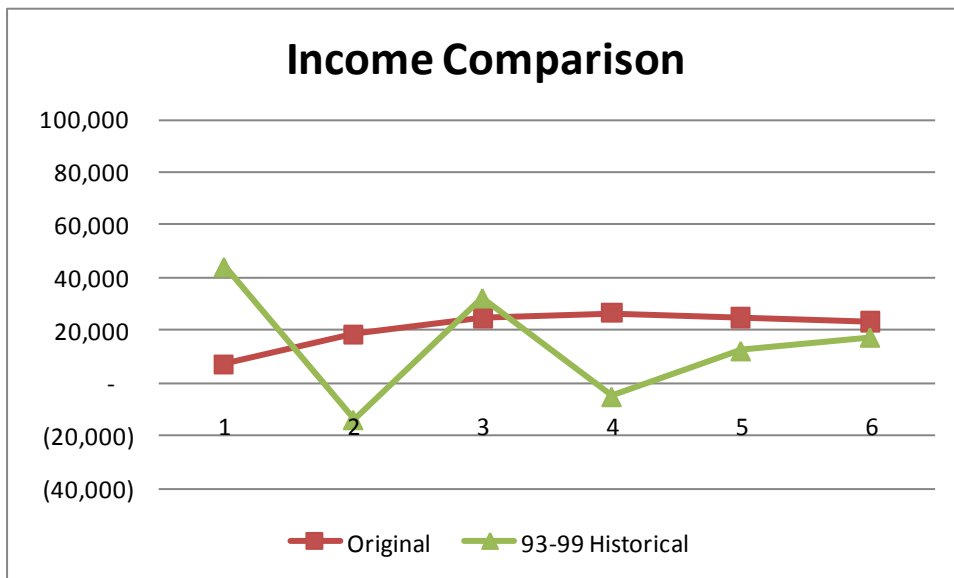


**Table 2-2 Asset and liability effect**

	time 0	time 1	time 2	time 3	time 4	time 5	time 6
<b>Original</b>							
CE	525,875	628,663	432,430	232,606	53,216	(109,348)	(256,011)
RA	83,054	75,326	69,103	63,760	59,221	55,334	51,782
RM	442,821	438,088	436,195	435,607	437,710	441,959	445,975
Liability	-	(115,249)	72,869	266,761	443,715	606,640	753,769
<b>"ACTUAL"</b>							
CE	525,875	641,381	409,095	226,203	1,553	(228,100)	(302,479)
RA	83,054	68,667	73,600	67,117	64,891	64,810	55,489
RM	442,821	438,088	436,195	435,607	437,710	441,959	445,975
Liability	-	(134,626)	100,700	276,520	501,048	734,868	803,943
<b>Income effect</b>		32,270	(34,124)	11,049	(38,195)	(43,758)	7,824
Cumulative		32,270	(1,854)	9,195	(29,000)	(72,758)	(64,934)
Liability change		19,377	(27,832)	(9,760)	(57,333)	(128,228)	(50,174)
Asset Change		12,893	25,978	18,955	28,333	55,470	(14,760)
<b>Income</b>							
original		7,189	18,378	24,806	26,523	24,704	23,201
actual		39,459	(15,747)	35,854	(11,672)	(19,054)	31,025

The asset changes described above does not offset the liability change for several possible reasons: (1) the effect of changes in the credit spread above the risk-free yield curve and (2) liability durations are much longer than those of the assets, thus creating an asset / liability mismatch. Figure 2-3 and Table 2-3 remove the effect of the change in credit spreads and illustrate the effect of asset / liability mismatch due to our simplified investment assumptions.

**Figure 2-3 Asset and liability effect -- credit spread removed**



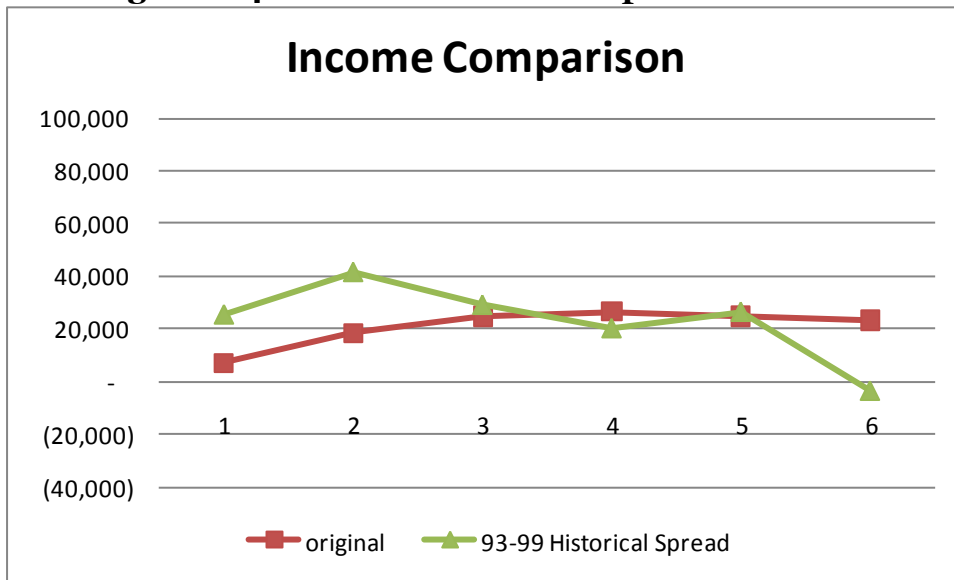
**Table 2-3 Asset and liability effect - credit spread removed**

consolidated		time 0	time 1	time 2	time 3	time 4	time 5	time 6
<b>Original</b>								
CE		525,875	628,663	432,430	232,606	53,216	(109,348)	(256,011)
RA		83,054	75,326	69,103	63,760	59,221	55,334	51,782
RM		442,821	438,088	436,195	435,607	437,710	441,959	445,975
Liability		-	(115,249)	72,869	266,761	443,715	606,640	753,769
<b>"ACTUAL"</b>								
CE		525,875	641,381	409,095	226,203	1,553	(228,100)	(302,479)
RA		83,054	68,667	73,600	67,117	64,891	64,810	55,489
RM		442,821	438,088	436,195	435,607	437,710	441,959	445,975
Liability		-	(134,626)	100,700	276,520	501,048	734,868	803,943
<b>Income effect</b>			36,969	(32,186)	7,556	(31,590)	(12,394)	(5,717)
Cumulative			36,969	4,783	12,339	(19,251)	(31,645)	(37,362)
Liability change			19,377	(27,832)	(9,760)	(57,333)	(128,228)	(50,174)
Asset Change			17,592	32,615	22,099	38,082	96,583	12,812
Reserve change	original		(115,249)	188,117	193,892	176,954	162,925	147,129
	actual		(134,626)	235,327	175,820	224,528	233,820	69,075
	delta		19,377	(47,209)	18,072	(47,574)	(70,895)	78,054
Reserve change	% of original		-17%	-25%	9%	-27%	-44%	53%
Liability	Actual/Original		117%	138%	104%	113%	121%	107%
Income	US GAAP		18,927	35,442	36,219	38,322	39,916	41,303
	1993 Base		7,189	18,378	24,806	26,523	24,704	23,201
	93-99 Histori		44,158	(13,809)	32,362	(5,067)	12,310	17,483

Another approach to illustrate the effect of credit spreads on the income statement would be to calculate the asset values by shifting credit spreads in the discounting of the cash flows used to calculate asset market value. This was done without changing the underlying yield curve and with no liquidity adjustments in the calculation. Figure 2-4 and Table 2-4 show the results.



**Figure 2-4 Asset effect -- credit spread reflected**



**Table 2-4 Asset effect - credit spread reflected**

Income	time 1	time 2	time 3	time 4	time 5	time 6
original	7,189	18,378	24,806	26,523	24,704	23,201
93-99 Historical Spread	25,473	41,428	29,101	20,303	26,482	(3,201)
<b>Income effect</b>	<b>18,285</b>	<b>23,050</b>	<b>4,296</b>	<b>(6,220)</b>	<b>1,778</b>	<b>(26,401)</b>

The 93-99 historical results are liability only changes and the 93-99 historical spread results reflect the effect on the valuation of assets if they were based on the original current estimate cash flow patterns, which match durations exactly.

### 2.3 Findings

1. Based on variations in interest rates during the historical period 1993-99 and not reflecting current measurement of assets, incorporating current market-based measurement will introduce significant volatility in income. (Figure 2-1 and Table 2-1)
2. To the extent that the duration of assets and liabilities aren't matched, whether credit margins are reflected or not, economic volatility will result. (Figures 2-2 and 2-3 and Tables 2-2 and 2-3)
3. Even when the duration of assets and liabilities are matched, fluctuating credit spreads alone can add volatility to reported income. (Figure 2-4 and Table 2-4)
4. The illustrations show the effect of the volatility created by different measurement bases for assets and liabilities, indicating the need to isolate the effect of the resulting income volatility.

## 2 Appendix - Discounting

To maintain consistency in our analysis we started with the initial yield curve (December 31, 2009) and shifted it subsequently by the amount of change reflected in the 1993-1999 yield curves, as shown in Table 2-5. There may be more refined methods to develop or portray the effects based on slope changes or relativities but as an example this is the simplest approach that presents the effect of changing yields.

**Table 2-5 1993-1999 Yield curve adjustments**

Year	1	2	3	5	7	10	20	30	
1993	3.61	4.21	4.54	5.15	5.48	5.77	6.4	6.25	
1994	7.14	7.59	7.71	7.78	7.8	7.81	7.99	7.87	
1995	5.31	5.32	5.39	5.51	5.63	5.71	6.12	6.06	
1996	5.47	5.78	5.91	6.07	6.2	6.3	6.65	6.55	
1997	5.53	5.72	5.74	5.77	5.83	5.81	6.07	5.99	
1998	4.52	4.51	4.48	4.45	4.65	4.65	5.36	5.06	
1999	5.84	6.10	6.14	6.19	6.38	6.28	6.69	6.35	
2000	5.6	5.35	5.26	5.17	5.28	5.24	5.64	5.49	
new base delta	2009	0.37	0.87	1.38	2.34	3.07	3.59	4.40	4.49
Projected year	1	3.90	4.25	4.55	4.97	5.39	5.63	5.99	6.11
	2	2.07	1.98	2.23	2.70	3.22	3.53	4.12	4.30
	3	2.23	2.44	2.75	3.26	3.79	4.12	4.65	4.79
	4	2.29	2.38	2.58	2.96	3.42	3.63	4.07	4.23
	5	1.28	1.17	1.32	1.64	2.24	2.47	3.36	3.30
	6	2.60	2.76	2.98	3.38	3.97	4.10	4.69	4.59

The forward rates used to derive the discount factors are then captured at each future year end and adjusted for illiquidity similar to the November 2010 SOA report. Since the future prices etc. are not available to derive the spot rates, we used the relationship from the original data to derive the future spot rate patterns. Table 2-6 provides the unsmoothed spot rates before liquidity adjustment. These spot rates were then used to derive the discount rates to be used at the end of each future year. Note the analysis will produce a change in each projected future year and then held constant, i.e., as if that year end yield curve remains for the balance of the projection. The spread assumption by contract year is shown in Table 2-7.

**Table 2-6 Spot rates based on initial spread**

<u>Duration</u>	Spots Based on initial spread					
	1	2	3	4	5	6
1	4.01%	2.18%	2.34%	2.40%	1.39%	2.71%
2	4.53%	2.26%	2.72%	2.66%	1.45%	3.04%
3	4.83%	2.51%	3.03%	2.86%	1.60%	3.26%
4	5.10%	2.81%	3.35%	3.11%	1.82%	3.52%
5	5.37%	3.10%	3.66%	3.36%	2.04%	3.78%
6	5.63%	3.41%	3.98%	3.64%	2.40%	4.13%
7	5.82%	3.65%	4.22%	3.85%	2.67%	4.40%
8	5.93%	3.78%	4.36%	3.94%	2.77%	4.46%
9	6.03%	3.92%	4.51%	4.04%	2.87%	4.52%
10	6.08%	3.98%	4.57%	4.08%	2.92%	4.55%
11	6.21%	4.18%	4.75%	4.23%	3.22%	4.75%
12	6.29%	4.31%	4.86%	4.33%	3.41%	4.88%
13	6.35%	4.41%	4.96%	4.41%	3.56%	4.98%
14	6.37%	4.44%	4.99%	4.43%	3.61%	5.01%
15	6.43%	4.54%	5.08%	4.50%	3.75%	5.11%
16	6.46%	4.59%	5.12%	4.54%	3.83%	5.16%
17	6.47%	4.60%	5.13%	4.55%	3.85%	5.17%
18	6.48%	4.61%	5.14%	4.56%	3.86%	5.18%
19	6.48%	4.61%	5.14%	4.56%	3.85%	5.18%
20	6.47%	4.60%	5.13%	4.55%	3.84%	5.17%
21	6.47%	4.60%	5.13%	4.55%	3.82%	5.15%
22	6.49%	4.63%	5.15%	4.58%	3.82%	5.14%
23	6.49%	4.64%	5.16%	4.58%	3.81%	5.13%
24	6.49%	4.64%	5.15%	4.58%	3.78%	5.10%
25	6.47%	4.63%	5.14%	4.57%	3.75%	5.06%
26	6.44%	4.61%	5.11%	4.55%	3.70%	5.01%
27	6.41%	4.58%	5.08%	4.51%	3.65%	4.95%
28	6.44%	4.62%	5.11%	4.55%	3.66%	4.96%
29	6.43%	4.61%	5.11%	4.55%	3.64%	4.93%
30	6.47%	4.66%	5.15%	4.59%	3.66%	4.95%

**Table 2-7 Spread assumptions by year**

	1	2	3	4	5	6
1	0.33%	0.45%	0.33%	0.45%	0.81%	0.68%
2	0.35%	0.47%	0.35%	0.47%	0.85%	0.72%
3	0.40%	0.54%	0.40%	0.54%	0.98%	0.83%
5	0.50%	0.68%	0.51%	0.68%	1.23%	1.04%
7	0.51%	0.70%	0.52%	0.70%	1.26%	1.06%
10	0.53%	0.72%	0.53%	0.72%	1.30%	1.09%
20	0.47%	0.64%	0.48%	0.64%	1.16%	0.98%
30	0.47%	0.64%	0.48%	0.64%	1.16%	0.98%

## 3 Expense

The objective of this section is to illustrate the effect of alternative treatments of insurance contract-related expenses, relating to (1) acquisition costs and (2) overhead costs. It examines these effects on term life insurance contracts.

### 3.1 Acquisition cost

#### 3.1.1 Alternative acquisition costs

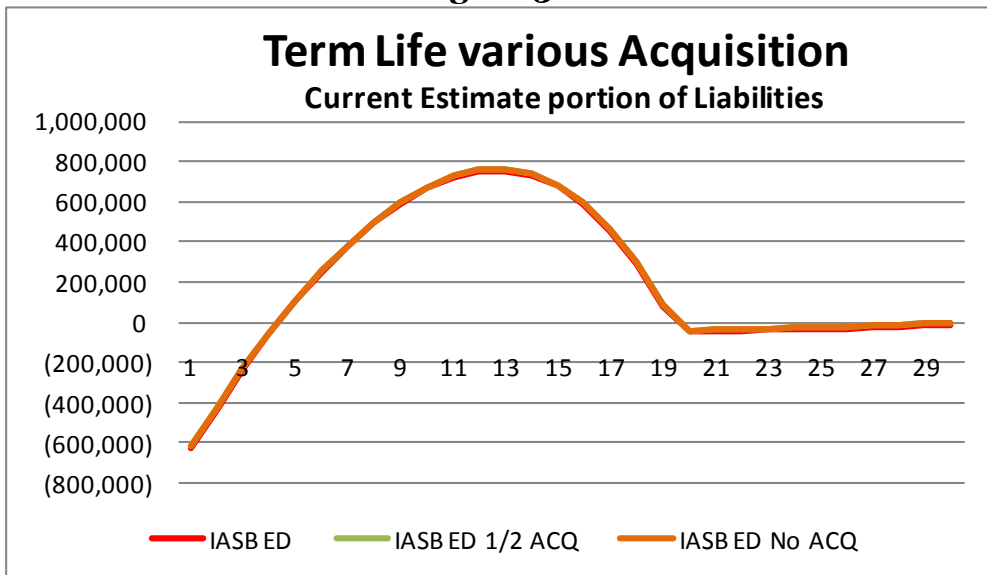
The base case developed by the ATFs included in the November 2010 SOA report assumed all acquisition costs (ACQ) are fully incremental to the portfolio. This amount is consistent with the cash flow estimates provided to the SOA by the applicable ATFs, although it may be somewhat greater than solely direct costs. These expenses are reflected in the current estimate calculation (of expected cash flows related to the fulfilment of the obligations of the portfolio of insurance contracts); their inclusion in building block one expected cash flows usually reduces the amount of the residual and composite margins (the exception being the portfolio of contracts whose margin would otherwise be negative).

In the November 2010 SOA report, a sensitivity measurement was applied that excluded all acquisition costs from the expected cash flows, thus treating all such costs as non-incremental to the contract as well as to the portfolio of contracts. In this paper, the liability and income using recalculated current estimates and margins were compared to the base case and are shown below in Figures 3-2 through 3-5, shown in the lines IASB ED and IASB ED NO ACQ. Note that these findings are about as might be expected -- reflecting none of the acquisition cost increases the current estimate, in turn increasing the amount of the margin to be amortized. At issue the income is decreased (a loss at issue equal to the amount of the acquisition cost not reflected in the expected cash flows), reflecting actual acquisition costs and a larger liability, while income in years 2 and later are increased reflecting the release of a higher margin.

An additional sensitivity measurement conducted for the purpose of this extension was developed that reflects 50% of the total acquisition cost as an estimate of the costs reflected in the liability, also shown in Figures 3-2 through 3-5. The 50% assumption could be reflective of either (1) an incremental-to-the-contract approach incorporated in the Exposure Draft that may apply to the many insurers that sell through brokers or commission-based agents or (2) an incremental-to-the-contract approach with a high level of acquisition cost overhead or if a successful-sale-only approach to acquisition cost was used with a high not-placed rate with a distribution channel with a high percentage of variable expenses compared to total expenses (this does not explore the implications of having to split commissions between the cost of unsuccessful and successful costs). The 100% incremental acquisition cost assumption may be an appropriate assumption in the case that the entire acquisition function was outsourced to a managing general agent. The 0% acquisition cost might represent successful sales costs for a web-based distribution system, as the percent of successful sales compared to overall exposures to the website would likely be quite small. The results for the 50% incremental case are generally, as expected, between the full and no allocation results.

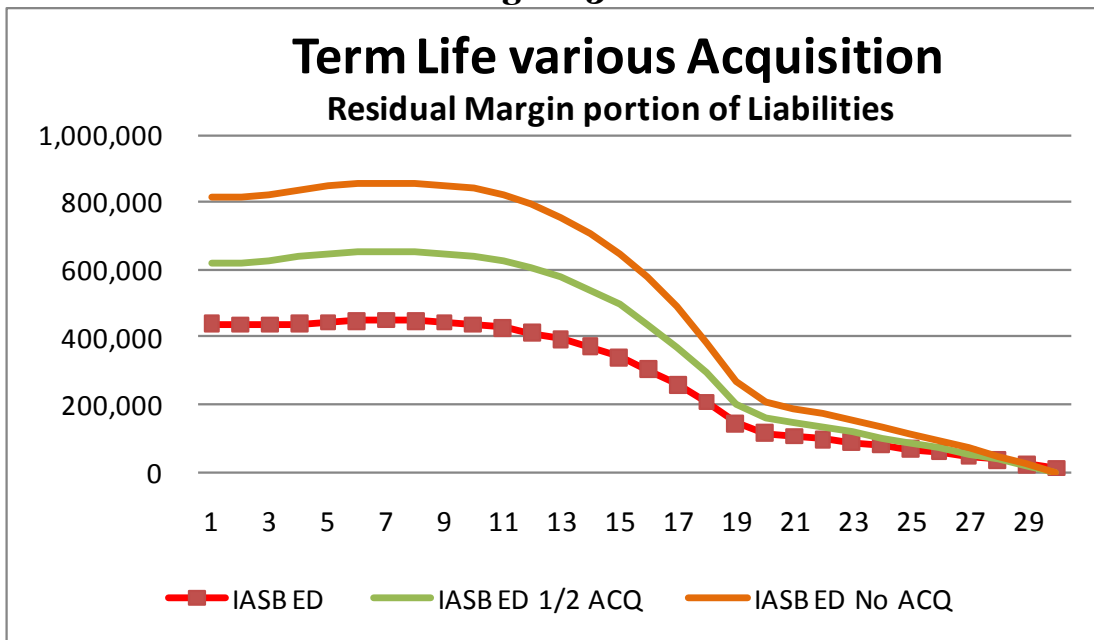
The current estimate after contract year 1 for the term life insurance contracts, shown in Figure 3-1, is the same for the three scenarios as acquisition costs as defined in the ED only impact the cash flows assumed to occur at issue.

Figure 3-1

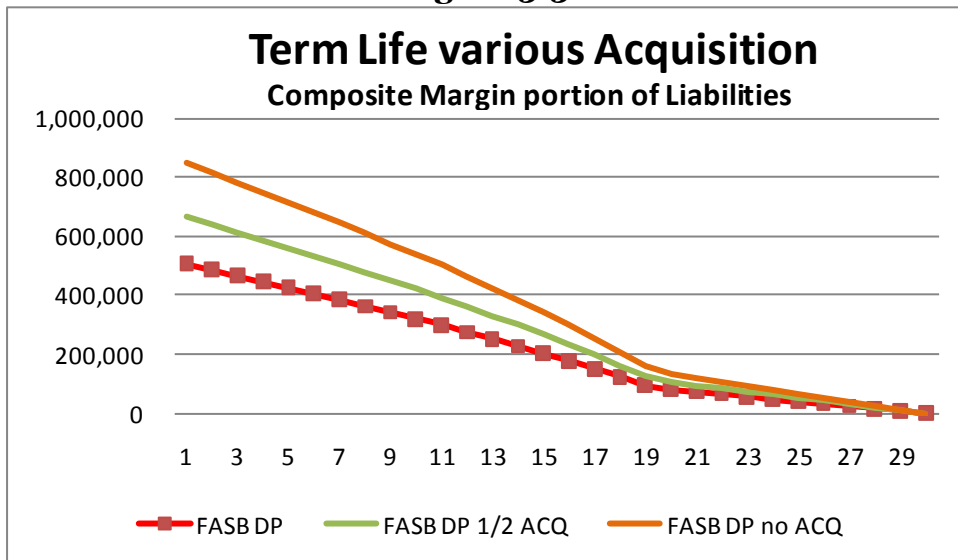


Figures 3-2 and 3-3 show the liability under the risk adjustment/residual margin (RM) and composite margin (CM) approaches for the three definitions of incremental expense. One reason for the curved nature of the RM liabilities seen in Figure 3-2 is due to the accretion of interest on the residual margin; this contrasts with the more linear nature of the CM liabilities seen in Figure 3-3 that does not reflect interest accretion.

Figure 3-2

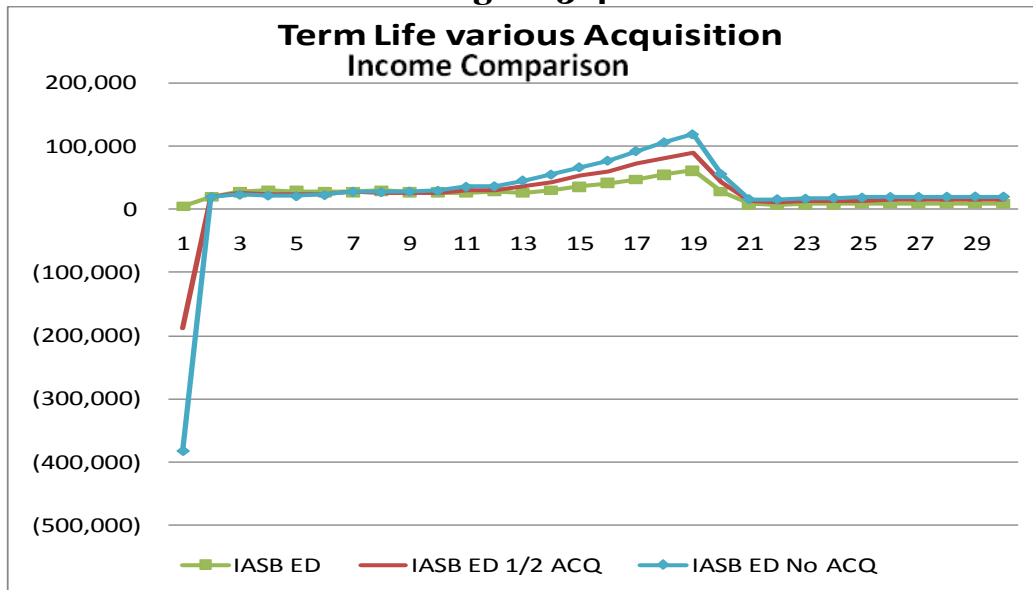


**Figure 3-3**

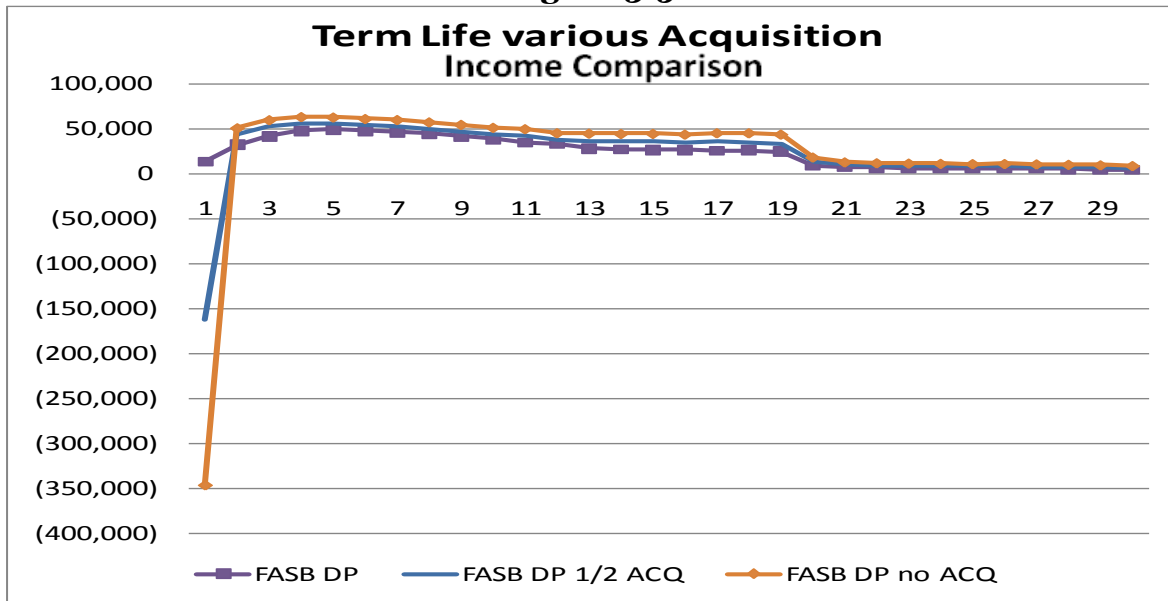


Figures 3-4 and 3-5 show the projected income under the three scenarios. The reason for the peak at contract duration 20 is that the residual/composite margins are run off over benefits, in this product peaking in the twentieth contract year, prior to a large voluntary lapse rate when the premium increases in the twenty first contract year.

**Figure 3-4**



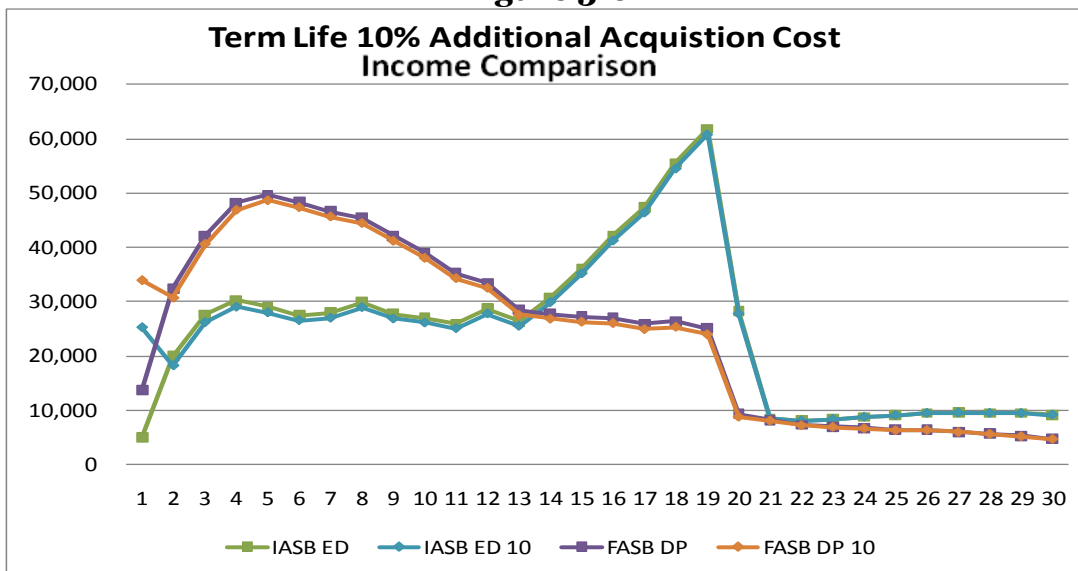
**Figure 3-5**



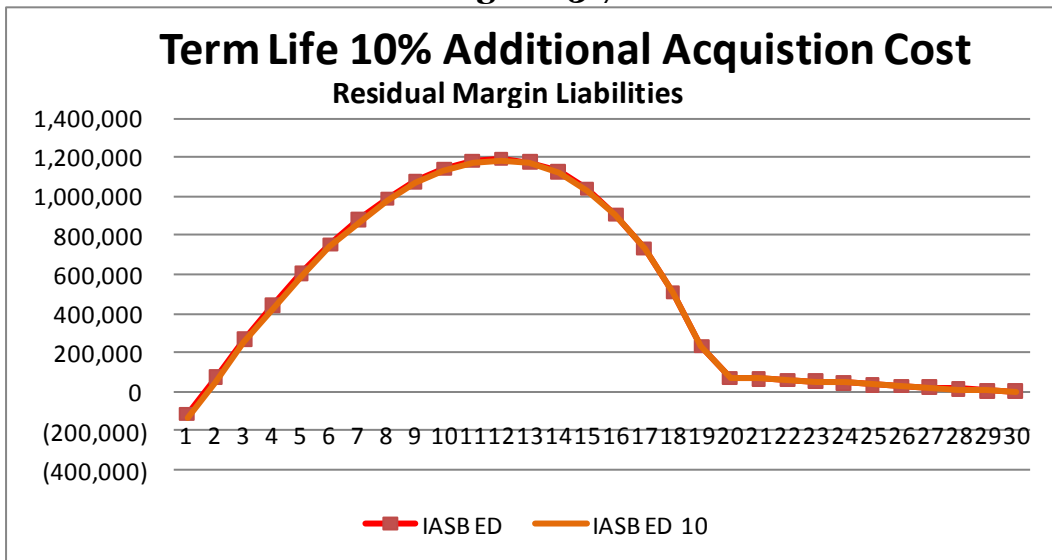
**3.1.2 Reflection of some overhead as being direct acquisition costs**

In this section we illustrate the effect of including some “overhead” costs in the acquisition costs considered to be incremental to the contract as these costs may better relate to the acquisition function. This is equivalent to increasing the 100% base case's acquisition cost allocation and reducing the annual cost included in the expected cash flows by a somewhat offsetting equivalent 10% of those costs. These results are shown in Figures 3-6 through 3-10. Figures 3-8 and 3-10 show the results of Figures 3-7 and 3-9, respectively, for only the first four contract years to more clearly show the difference in results shown in Figures 3-7 and 3-9. In these figures, the future liability is decreased somewhat as the CE component is smaller but the RM and CM components are unchanged.

**Figure 3-6**



**Figure 3-7**



**Figure 3-8**

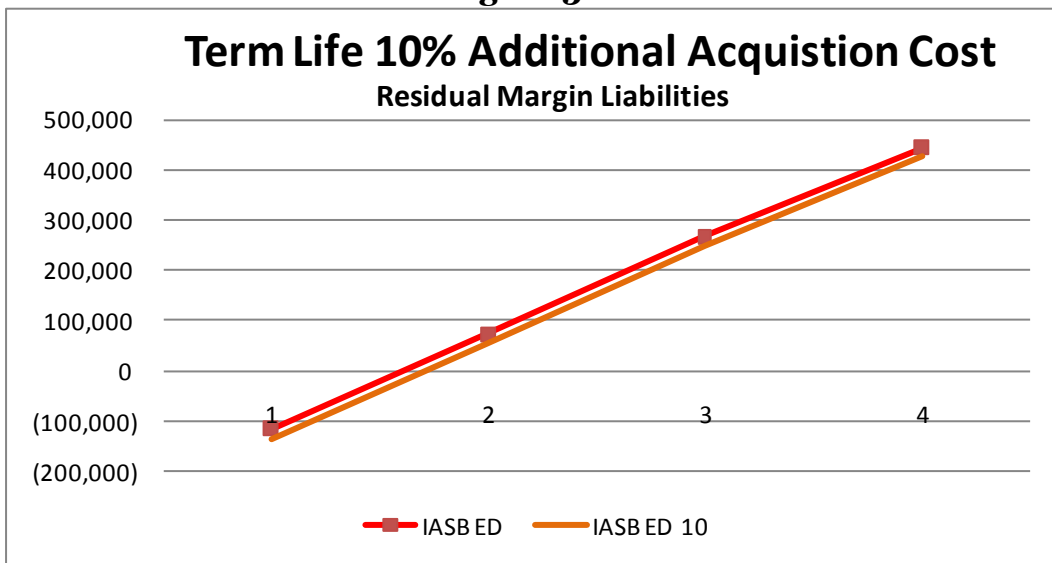




Figure 3-9

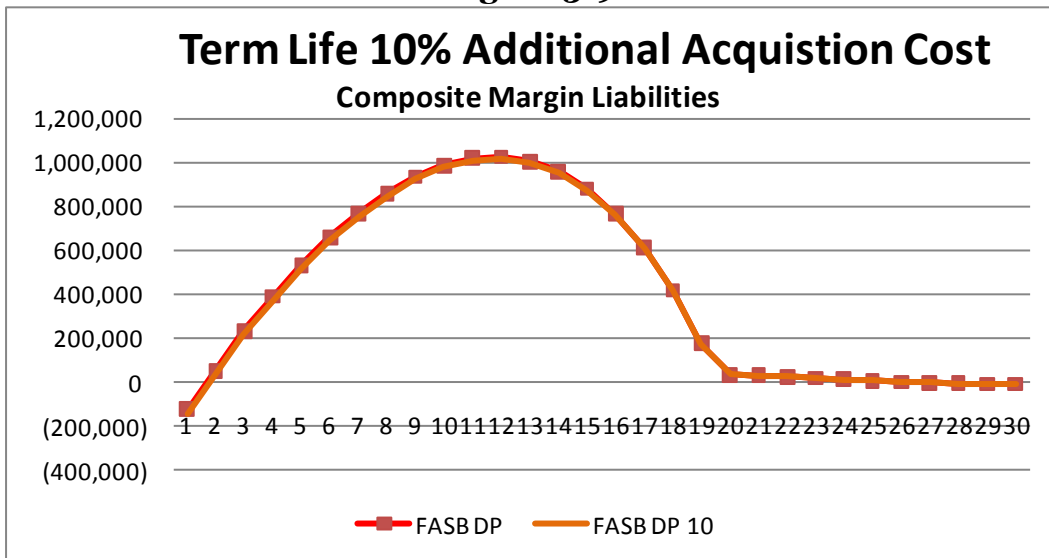
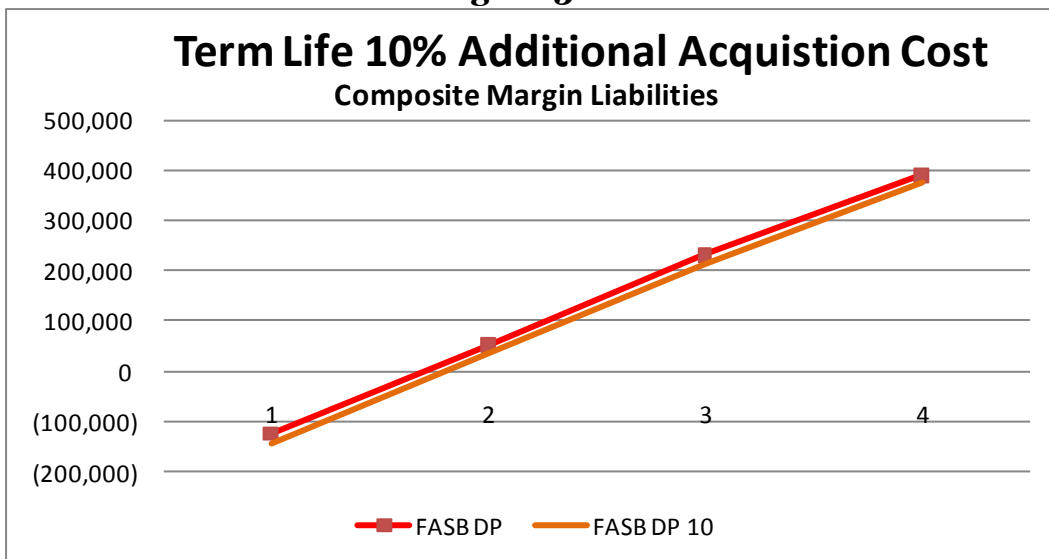


Figure 3-10



### 3.2 Overhead costs

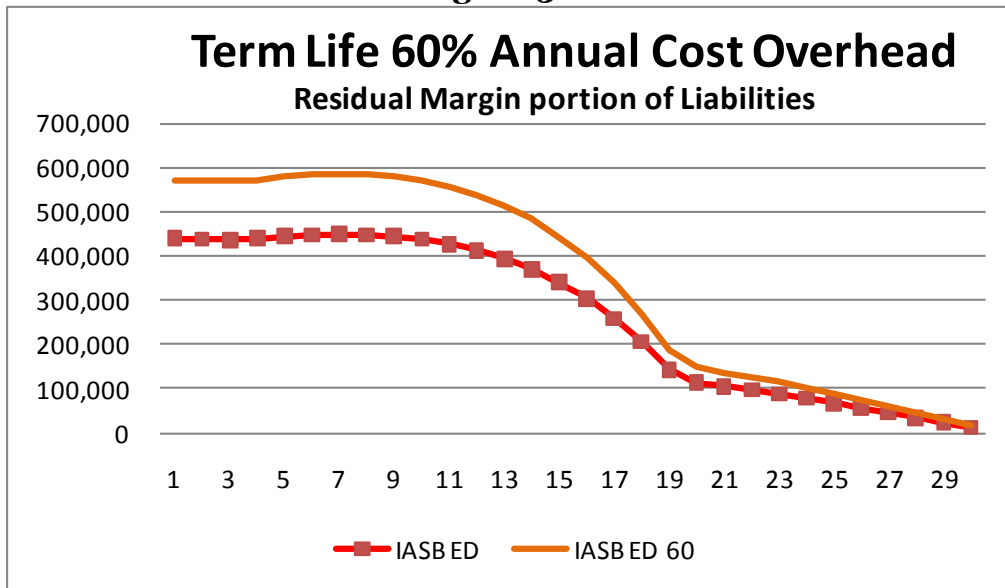
With regard to overhead costs (independent of the second set of acquisition cost examples illustrated in Figures 3-6 through 3-10), the base term insurance model provided by the ATF in the original research report did not explicitly identify the portion of annual allocated costs considered a distinction between annual maintenance costs from those that would be considered to be overhead costs. The total annual costs were thus a combination of maintenance (direct) and overhead costs, reflecting all period costs that would be included in the current estimate. In this section we illustrate an additional sensitivity that removes an estimate of the overhead expenses as if they were non-incremental.

The illustration assumes that 60% of total annual costs are overhead-related. This assumption was based on the results given in the 2007 SOA inter-company life/health/annuity expense study. (Note that this is one interpretation of the ATF provided data; another would be that overhead was

totally excluded and not considered at all -- that interpretation would imply the income shown in our earlier paper was too low or simply showed income before overhead.) The results of this assumption are shown in Figures 3-11 through 3-13 below. The results show a decrease in expenses included in current estimates and thus an increase in the margins to be amortized. The effect of the inclusion of overhead (60% of total annual expenses) in the current estimate on income is shown in Figure 3-13.

Figures 3-11 and 3-12 show the effect of overhead on the risk margin and composite margin that are a part of the liability, respectively. Figure 3-13 show the effect on income under both margin approaches. These compare the use of 100% of the annual costs and 40% of the annual costs in the expected cash flows. The former assumption may be reflective of total costs while the latter may correspond to direct costs. They both assume the base acquisition cost approach described above.

**Figure 3-11**



**Figure 3-12**

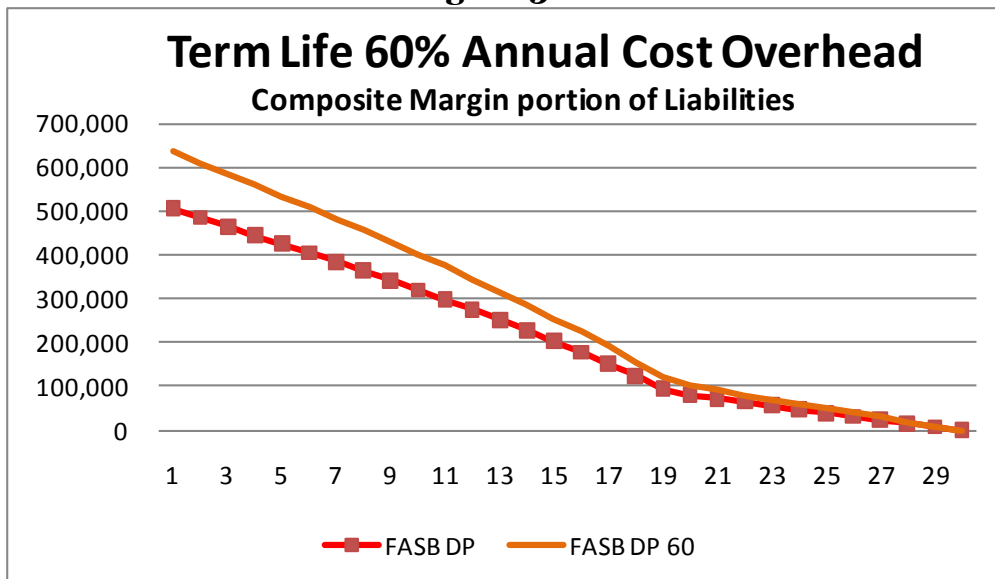
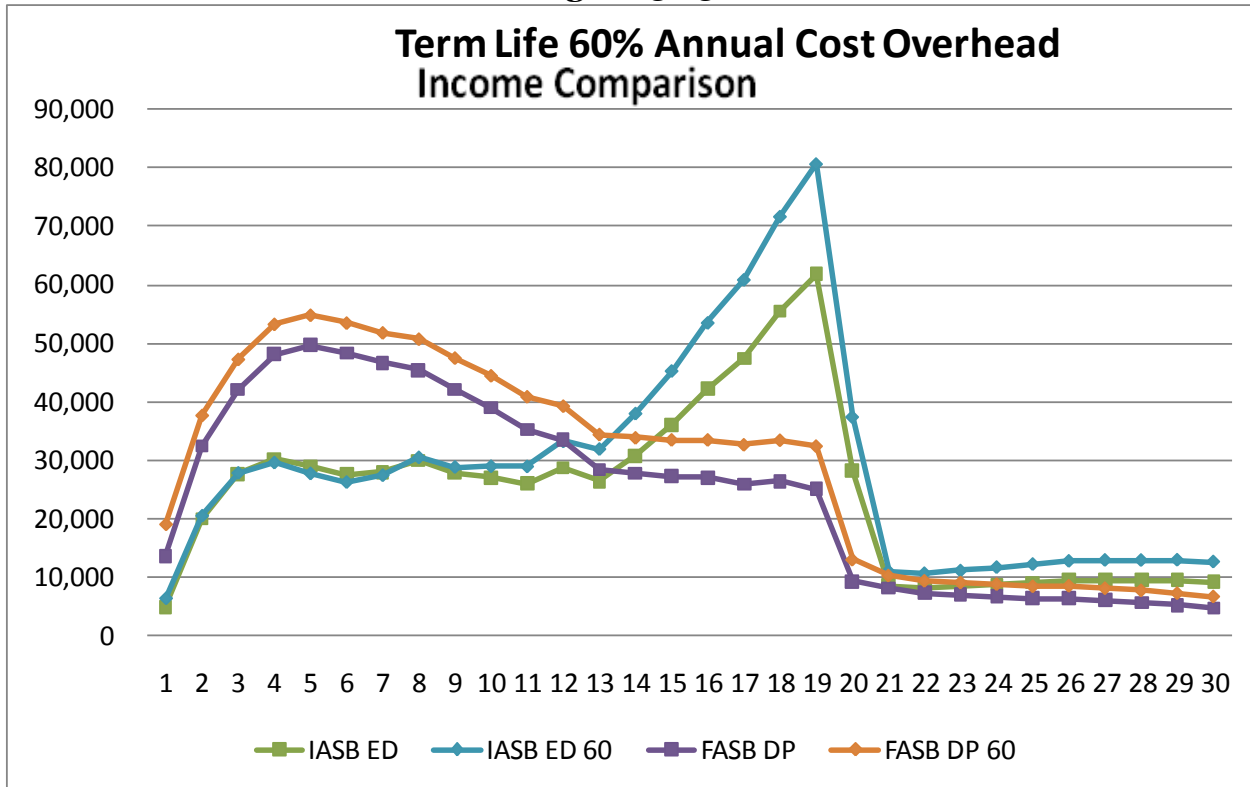


Figure 3-13



### 3.3 Findings

1. To the extent that initial acquisition costs are not included in expected cash flows, the unit of account (e.g., contract, successful sale, and portfolio) can significantly affect the amount of acquisition costs considered incremental and thus the initial loss for a portfolio of insurance contracts. (Figures 3-1 through 3-5)
2. To the extent that the timing of overhead is not consistent with the amortization of the margin, inclusion of overhead costs as expected cash flows can affect the liability after issue and subsequent margin release. (Figures 3-6 through 3-10)
3. Allocation of overhead costs to initial contract recognition can affect subsequent measurement of the liability of insurance contracts. Although unless large in proportion to initial acquisition cost, the affect may not be significant. (Figures 3-11 through 3-13)

## 4 Subsequent measurement of margins

The objective of this section is to illustrate the effect of alternative approaches to the subsequent measurement of margins. Section 4.1 provides perspective on alternative locked-in approaches, including the effect of the accretion of interest and the distinction for certain products of benefits and exposure to insurance risk, while Section 4.2 provides perspective on a possible remeasured approach. It looks at both term life and LTC contracts.

### 4.1 Amortization of margins using an unremeasured approach

The base case reflects the methodology described in the IASB ED, that is, the margin is amortized based on the expected benefits, accreted with interest. In both types of contracts illustrated here there are no account balances, surrender benefits, dividend payments or maturity amounts -- as a result, alternative treatment of those benefit flows (that may or may not be included as a 'benefit') do not affect the amortization of the margins. Reflection of policyholder termination rates in excess of those expected are not illustrated here (although in general if such a difference emerges in the LTC contracts, the results are favourable to the insurer, while for term insurance it may be either favourable or unfavourable, depending upon the contract and timing of the terminations).

The effect of the inclusion of interest accretion on the margin balance and the base over which a margin is to be amortized is shown in Figures 4-1 through 4-4 for comparison to the three alternatives evaluated. Figures 4-1 and 4-2 show these effects on the Term contract and Figures 4-3 and 4-4 show these effects on the LTC contract). The following four cases are illustrated:

- Base case, amortized according to benefits paid, with interest accreted on the current balance ('Base')
- Base case with no accretion of interest ('Base no interest')
- Amortized based upon the face amount of insurance with interest accreted on the current balance ('Face')
- Amortized based upon the face amount of insurance with no accretion of interest ('Face no interest').

Expected benefit/claim cash flows are affected by both expected benefit incidence and by contract persistency. For both Term and LTC, the rates of benefit increase, but the effect of persistency, especially for Term, significantly affects their duration. For example, there is a significant voluntary lapse rate in the 21st contract year for the Term business illustrated, therefore a significant reduction in incurred benefits occurs from then on. The voluntary lapse is quite low for LTC, as the very steep increase in the rate of claim at older attained ages encourages particularly good contract persistency. Therefore, even though the face amount (that is, the amount of death benefit or amount of daily long-term care benefit) is level, the rate of amortization changes significantly by contract duration if the rule used is that amortization varies by expected incurrence (or payment) of benefits. As a result, for both contracts, as shown in Figures 4-1 and 4-3, income is deferred if the ED approach is used compared with amortization by face amount of insurance.

Particularly when there is a steeply rising rate of incurred benefit and low lapse rate, the amount of interest accretion can be considerable, both increasing the liability and deferring income. Thus, under both bases of amortization, interest accretion on margins (as shown in Figures 4-2 and 4-4) results in larger margin balances and liabilities, and in deferral of income than if interest is not accreted (as shown in Figures 4-1 and 4-3).

Figure 4-1

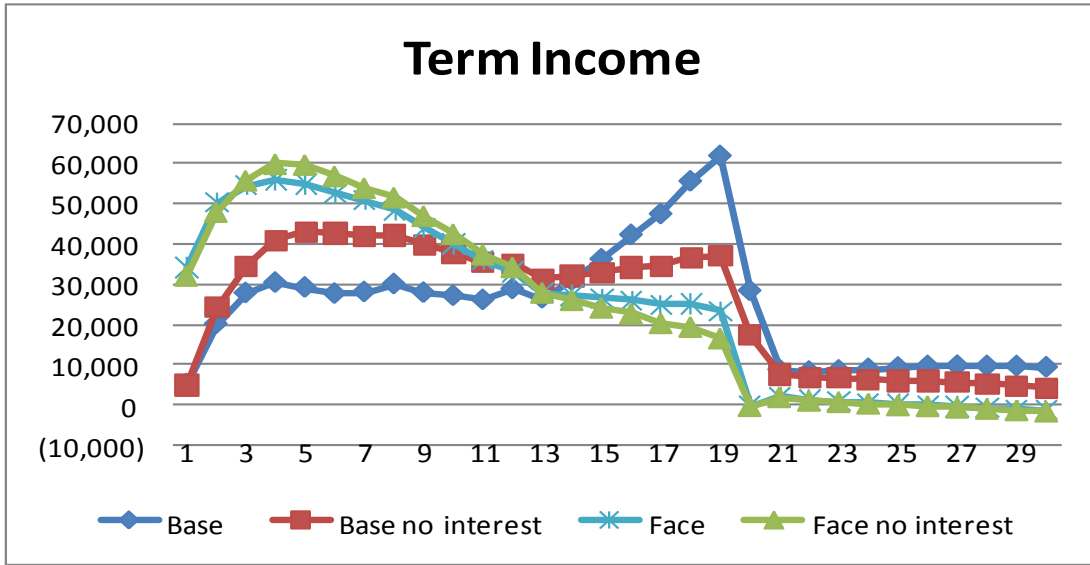


Figure 4-2

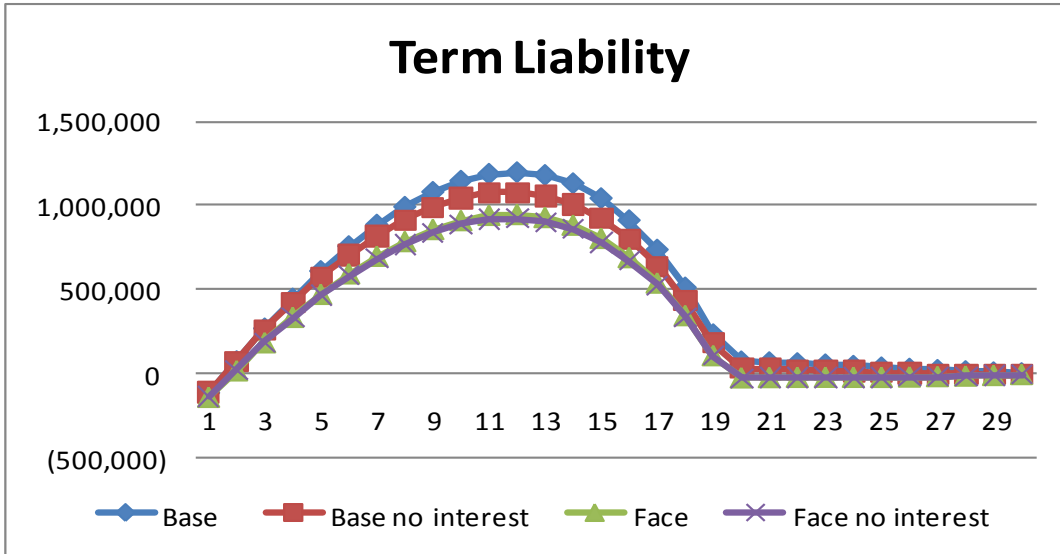


Figure 4-3

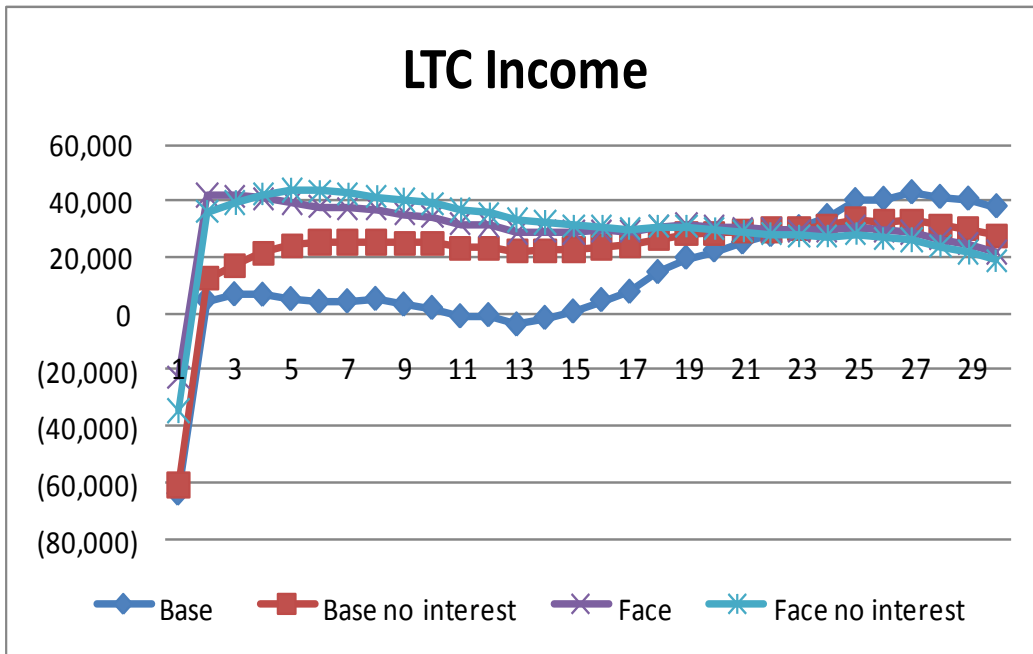
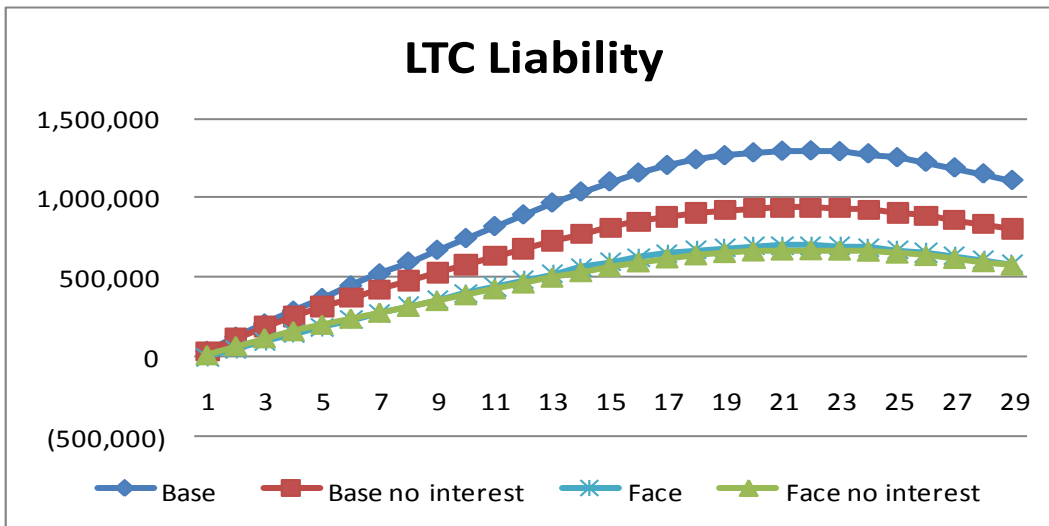


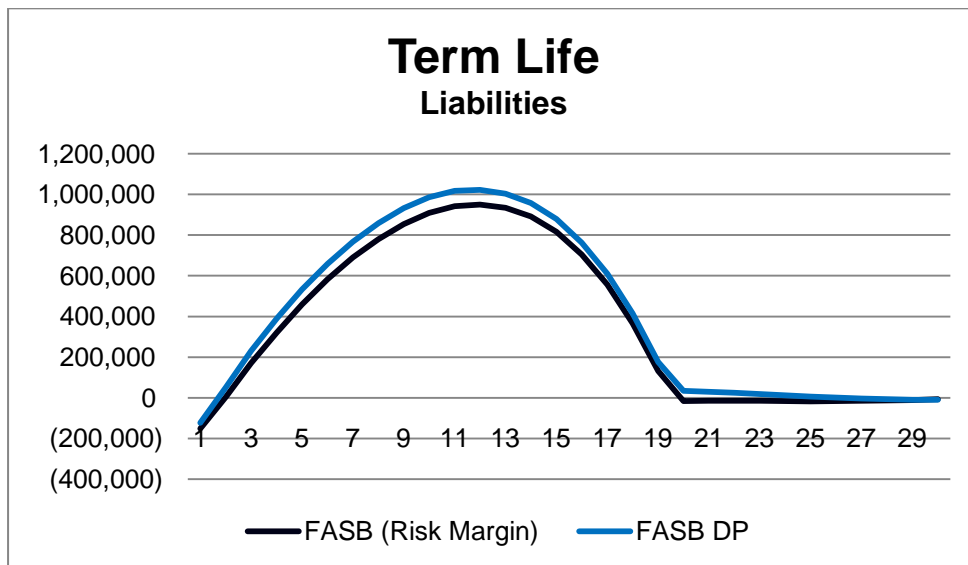
Figure 4-4



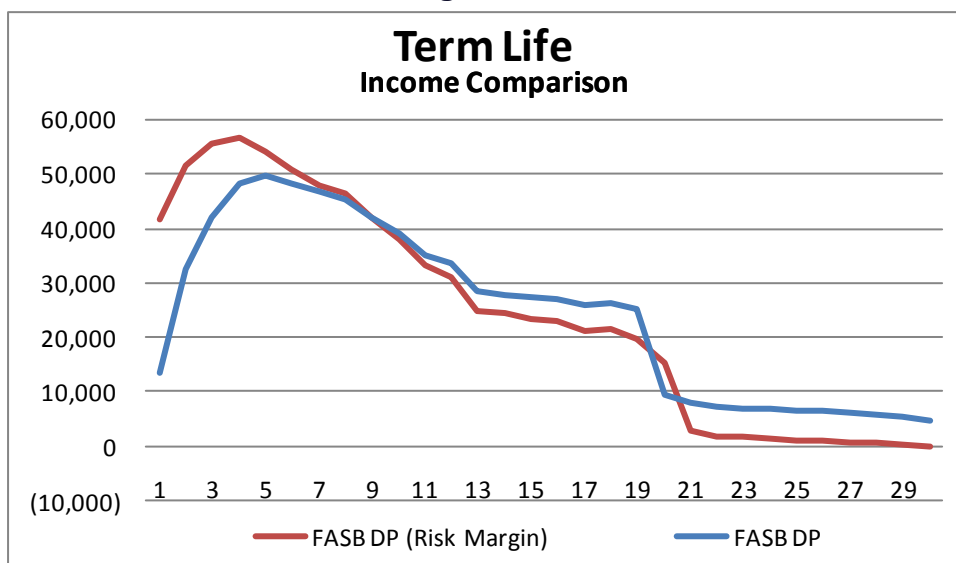
Another approach to subsequent measurement of margins that has been discussed is to amortize the composite margin in a manner consistent with the release from risk based upon the determination of the adjustment for risk. Similarly, the effect of the residual margin could also be amortized in this manner; note that the initial composite margin equals the sum of the residual margin plus adjustment for risk except in the case that the initial composite margin is less than the initial adjustment for risk. To illustrate the possible results of this approach Figures 4-5 and 4-6 compares the composite margin for Term based upon the release of the adjustment for risk and that included in the DP, the pattern of expected premiums and benefits without interest accretion. The pattern of the adjustment for risk is based on the cost of capital method as described in the November 2010 SOA report. Since the cost of capital method tends to release the risk adjustment earlier than certain other

methods, if a different risk adjustment method is applied or if interest is accreted on the balance, the income would be somewhat more deferred than illustrated in Figure 4-6.

**Figure 4-5**



**Figure 4-6**



Note that the definition of claims/benefits can influence the amortization pattern for the ED and DP proposals. Due to the contracts whose results are displayed in this section, the alternative inclusion of claims/benefits is not shown in this report.

## 4.2 Amortization of margins using a remeasured approach

To illustrate the effect of unlocking the amortization of the residual or composite margin we developed an example based on the LTC contract included in the November 2010 SOA report. A sensitivity included in that report assumed the morbidity (incidence) rates decrease in the third

contract year by 15% relative to the time of issue (in this example it took three years to recognize that experience differed from that initially expected).

Using the method presented in the ED, such a change in assumptions does not result in an adjustment to the residual margin amortization. Thus, the change in current estimate in contract year three is totally reflected in income in that third year, without an offset in the residual margin (although that possibility might also be considered, but is not illustrated here). It should be noted that no change to the risk adjustment in the ED methodology was made in the base results or the sensitivities shown here to isolate the impact of issues involving the residual margin.

We illustrate two new sensitivities for each valuation method (the IASB's ED risk/residual method and the FASB's DP composite margin method). The two sensitivities are:

1. 'Remeasure Prospectively' (no remeasurement of the initial residual margin). The improved morbidity increases the current estimate as it had in the November report. The amount of that increase was then reflected as an increase in the residual margin and future amortization is changed in a consistent manner.
2. 'Remeasure From Issue' (a remeasurement of the initial residual margin on a theoretical basis, that is, at the end of a reporting period the current estimate and the residual margin are recalculated as if the then expected cash flows reflect actual experience through the reporting date and current assumptions at the report date). The initial current estimate was recreated in contract year 3, thus resulting in a revised estimate of the initial residual margin. The amortization that would have occurred prior to and through contract year 3 on this basis is all reflected in income in year 3. Amortization was then subsequently adjusted as if the remeasured residual margin had been in effect since issue. Thus, the income impact from prior years is reflected in contract year 3 as an immediate adjustment of prior experience (referred to as a 'catch up adjustment', similar to the retrospective adjustment concept used in DAC amortization in U.S. GAAP as applied to SFAS 97 universal life type insurance contracts).

Figures 4-7 through 4-12 illustrate this alternative approach, with selected values following the figures. Figures 4-7 and 4-10 show the liabilities for the ED (residual margin) and DP (composite margin) approaches, respectively. Figures 4-8 and 4-11 show the margins separately to better illustrate their effect. Figures 4-9 and 4-12 show the resulting income for the ED and DP, respectively. The primary difference between the residual margin and composite margin approaches is that residual margin includes an interest accretion.



Figure 4-7

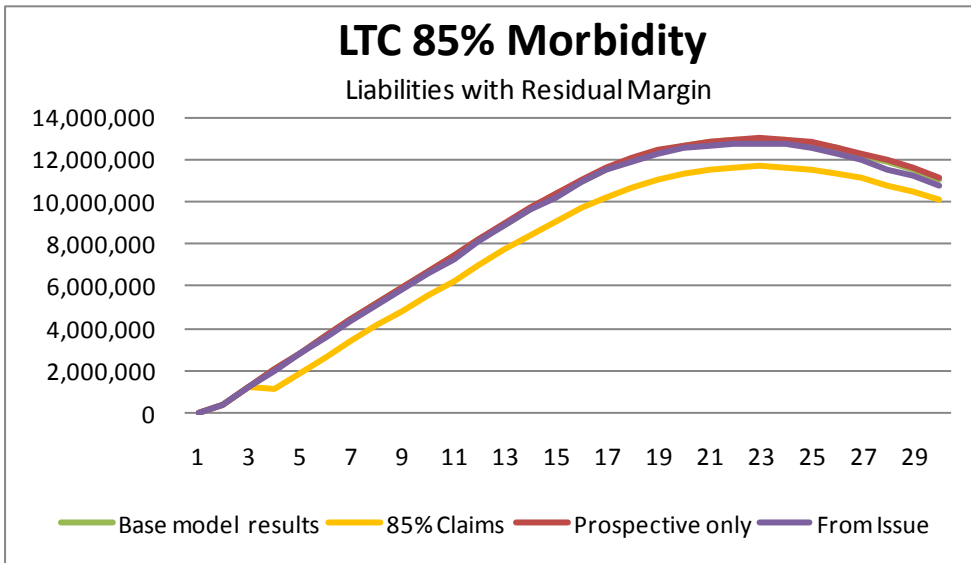


Figure 4-8

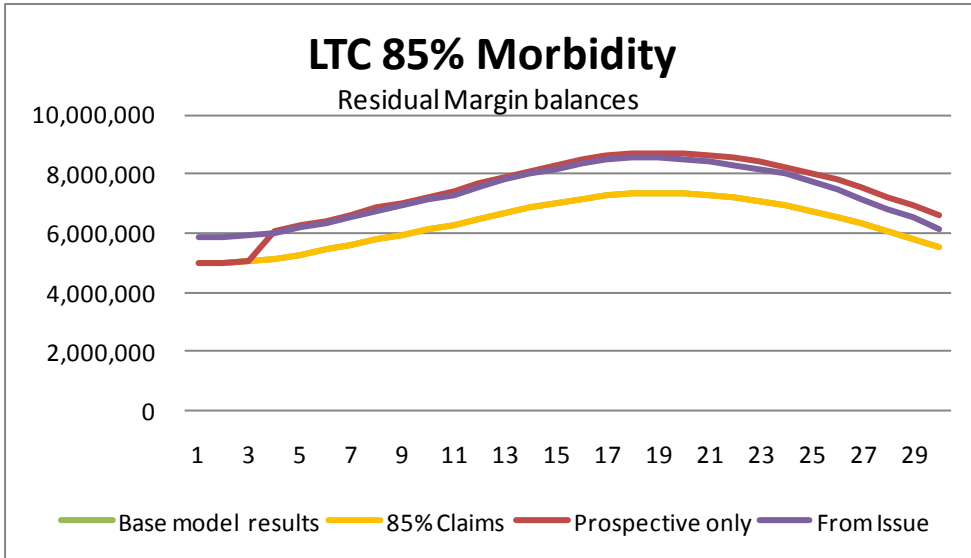


Figure 4-6 note -- Base model and 85% residual liabilities are the same by definition.

Figure 4-9

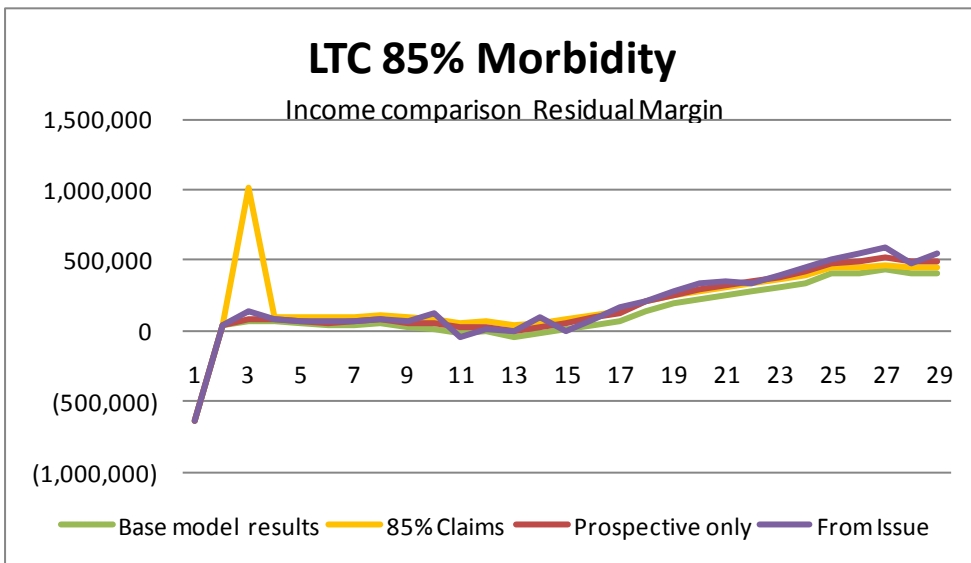


Figure 4-10

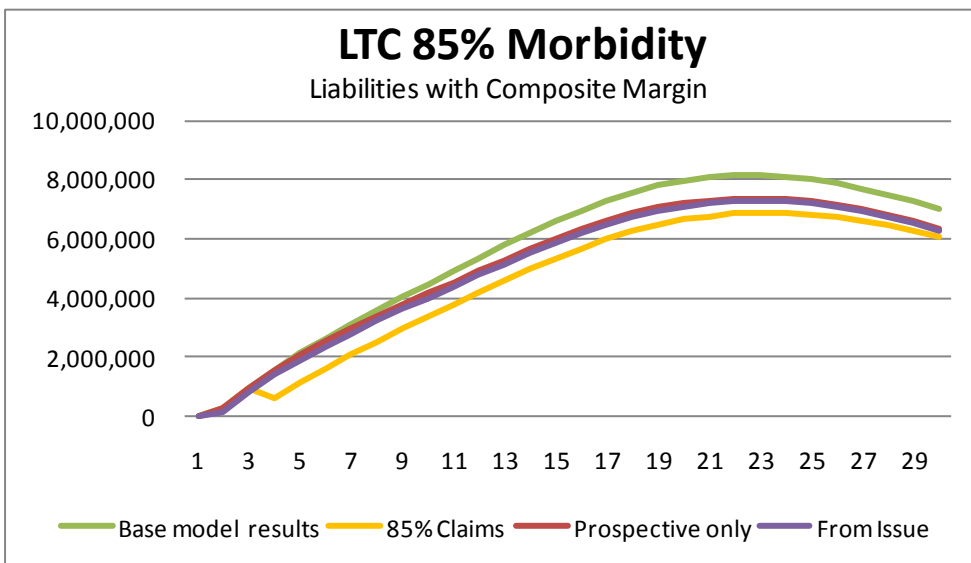


Figure 4-11

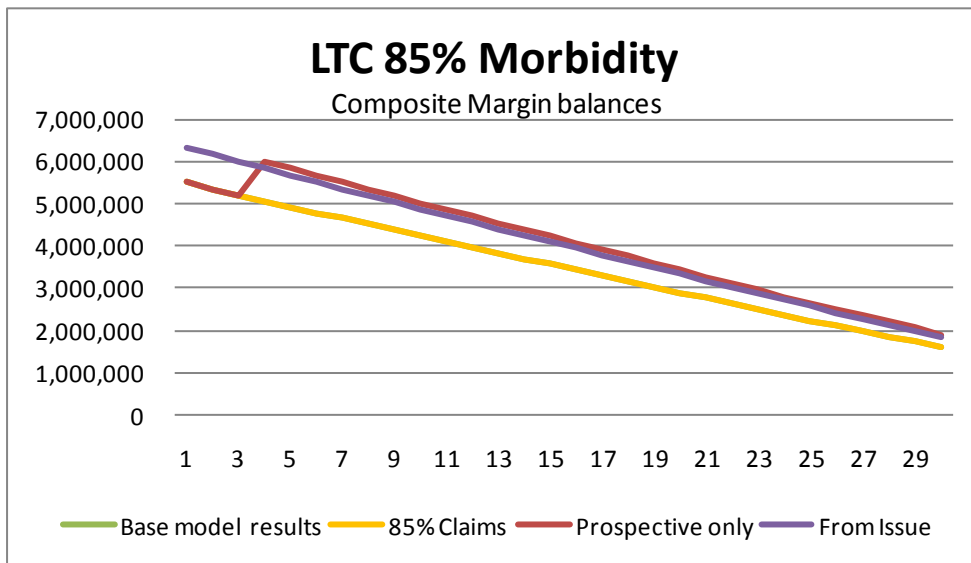
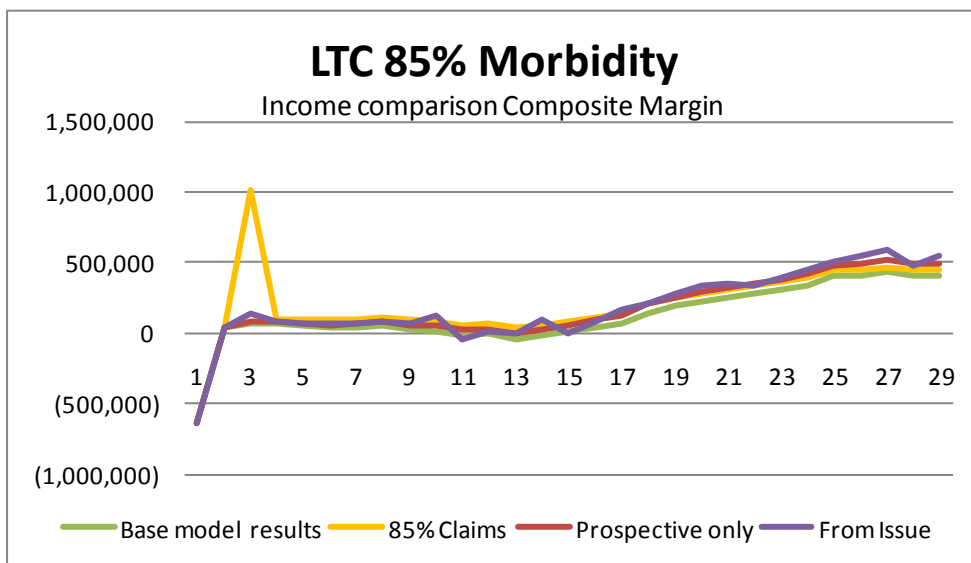


Figure 4-9 note -- Base model and 85% composite margin are the same by definition

Figure 4-12



It should be noted that the change in the current estimate for the remeasure From Issue calculation related to the change in initial current estimate is captured in the catch up item that includes the effect of what would have been the prior amortization of residual margin components if the original expectations were equal to subsequent performance. Tables 4-1 and 4-2 indicate the effect of these two situations in contract year 3 in both the ED (assuming that the risk adjustment is not affected) and the DP.

**Table 4-1**

<b>Residual Margin</b>			
<b>Year 3 income calculation</b>			
	Base 85%	Prospective	From Issue
Net Cash Flow	894,792	894,792	894,792
Change in CE	(178,337)	(178,337)	(178,337)
Change in RA	(32,126)	(32,126)	(32,126)
Change in RM	86,695	1,027,306	84,484
Catch up			886,231
	1,018,560	77,948	134,540

**Table 4-2**

<b>Composite Margin</b>			
<b>Year 3 income calculation</b>			
	Base 85%	Prospective	From Issue
Net Cash Flow	894,792	894,792	894,792
Change in CE	(178,337)	(178,337)	(178,337)
Change in CM	(141,218)	799,394	(162,535)
Catch up			786,315
	1,214,347	273,736	449,350

### 4.3 Findings

1. In longer duration contracts, accretion of interest on the margin balance can increase the outstanding balance significantly and defer income recognition, particularly with steeply sloping claim/benefit rates and low lapse rates. (Figures 4-1 through 4-4)
2. Selection of the base over which amortization of initial margin is determined can significantly affect the subsequent size of liabilities and resultant income. In longer duration contracts with increasing claim/benefit rates, liabilities will be greater and resulting income deferred if an alternative approach is used, e.g., face amount of life insurance or release from risk. (Figures 4-1 through 4-6)
3. Although prospective remeasurement of margins recognizes the effect of actual experience / current changes in estimation on a cumulative catchup basis, this effect in the current period can be smaller than for non-remeasurement. (Figures 4-7 through 4-12)