Society of Actuaries

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

Report of Findings

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Executive Summary

This report summarizes the results of a research project undertaken by the Society of Actuaries (SOA) (1) to provide insight into the possible effects of the International Accounting Standards Board's (IASB) Exposure Draft, *Insurance Contracts* (ED), and (2) as technical support to the Financial Reporting Committee of the American Academy of Actuaries (AAA) in drafting its response to the IASB's invitation to comment on its ED regarding the future financial reporting of insurance contracts. The objectives of this project also include providing an educational base for members of the SOA and other interested parties and an assessment of the extent to which practical models can address some of the key issues involved in applying the ED proposal.

This report presents comparisons of selected U.S. GAAP values to corresponding values of the proposed International Financial Reporting Standard (IFRS) on Insurance Contracts, particularly relevant because most of the products addressed are currently measured by U.S. GAAP, and the joint nature of the insurance contracts project of the IASB and the Financial Accounting Standards Board (FASB). 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 scope of this research project covers life, health, and annuity products, but not property and casualty insurance products. The life, health, and annuity contracts selected to be modelled are actual contracts offered by insurers and are believed to be representative of those currently offered by U.S. life insurance companies. Thirteen Actuarial Task Forces (ATFs) from seven insurers, accounting firms and consulting firms (several firms had more than one ATF) modelled eight product category groupings. Particular focus has been placed on the presentation of the resulting pattern of net income for new business under the two reporting bases (in the ED and the FASB's Discussion Paper (DP), with the only relevant difference being between the use of risk adjustment and residual margin, and composite margins, respectively). In the base case, the illustrated results assume that no assumption changes are made and the actual experience that emerges is equal to that expected at the issue date of the contracts. When differences arise, the ED and DP results show the effect of changes in assumptions immediately, while U.S. GAAP typically spreads the effects over time.

The following are the principal findings of the project:

- The proposals in the ED and DP represent a significant change in the measurement of liabilities for insurance contracts from current standards and practice. This change will in many cases require extensive changes in financial reporting values, actuarial practice and valuation systems.

- For the products within the scope of this project, several standards-related issues need to be resolved before final determination of the effect of the revised IASB standard.

- The impact of the ED proposal varies significantly by type of contract.

- Because actual experience and changes in assumptions, including discount rates, are immediately recognized, resulting income will likely be more volatile and more responsive to current and expected future conditions than under current U.S. GAAP for most products.

- For those contracts with a residual and composite margin, the subsequent measurement of the margin can have a significant effect on the pattern of income, as well as the liability. The combination of accretion of interest and amortization based on expected benefits and claims can produce an increasing residual margin balance over the course of an insurance contract.

- There are many practical issues that will have to be addressed by practicing actuaries in the measurement of the liabilities.

- Further research will benefit the measurement techniques needed to comply, for example, in the areas of discount rates, unbundling approaches, risk adjustment techniques and calibration.

The U.S. products selected to be studied in this project are thought to be representative of the major products issued in the United States (a limited number of non-U.S. products are also included). Nevertheless, the results shown should not be assumed to apply in the same manner to all insurers without independent modelling, as both prices, models used, expected experience and ED interpretations vary, in some cases significantly, for the products modelled. In most cases, existing models and methodologies were either applied or adapted to develop the values shown in this paper. If the models had been developed from scratch to satisfy the preliminary views as expressed in the ED, resulting values would likely differ from those shown. For example, it is important to note that, because of a lack of available information or resources, not all aspects of the ED proposal were modelled, e.g., limited modelling of alternative risk adjustment methods was conducted, asymmetric benefit payment distributions may not have been assumed, and assets were not modelled. Other limitations of this study are that, other than in limited sensitivity tests, actual experience is assumed to be equal to that expected at the time of issuance of the contract.

1. Background

An international financial reporting system for insurance contracts has been under development, first by the International Accounting Standards Committee and then the International Accounting Standards Board (IASB) for the last thirteen years. In 2005 an interim reporting system, referred to as Phase I and implemented in International Financial Reporting Standard (IFRS) 4, *Insurance Contracts,* was adopted for use in Europe and certain other areas. This financial reporting system primarily relies on what previously were local financial reporting standards that related to insurance contracts, which would be U.S. GAAP for most insurance companies in the United States. In May 2007, the IASB released a *Discussion Paper with Preliminary Views on Insurance Contracts* (2007 DP). A previous report of the Society of Actuaries (SOA), dated January 29, 2008, provided illustrations with respect to the 2007 DP.

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, the ED was published by the IASB on July 30, 2010. The FASB distributed a DP on September 17, 2010 that wrapped the ED and included a discussion of its current views and, most relevant to this study, a composite margin approach described in Section 2.2.4.

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 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, members of the Actuarial Task Forces (ATFs) involved, the Society of Actuaries (SOA), or PricewaterhouseCoopers (PwC).

1.1 Purpose of the Project

In an effort to better understand the potential effect of the proposed accounting model described in the IASB's ED and certain variations in the views of the FASB as indicated in its DP, the AAA asked the SOA to conduct research that incorporates modelling of new business to illustrate the expected effects of the 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. This report describes the results of that study.

The focus of this research is the development of baseline illustrative financial statement results using the financial reporting model proposed in the IASB's ED and the FASB's DP. In addition, corresponding values using current U.S. GAAP standards were also developed, which may be particularly relevant to the FASB's deliberations regarding whether it should adopt the final IASB standard, modify its current standards or introduce variations in the final IASB standard.

The objectives of this research include development of background information regarding possible implications of the proposal in the ED and DP on U.S. products (and a limited number of non-U.S. products) to members of relevant financial reporting task forces and committees of the AAA, as well as to facilitate the education of SOA members on the proposals. In order to gain understanding and insight into the proposed methodology, alternative approaches and sensitivities around key assumptions. Through this research study and its resulting report, the SOA also hopes that the results of this study will also prove useful to the IASB and the FASB in their deliberations.

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 final interpretation that will be given to the ultimate IASB standard, which

may prove incorrect. Nevertheless, those assumptions have been used in this process. They are described in this paper.

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. The products modelled are described in Section 1.2.4. 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 Steven Barclay, Sam Gutterman, and Randy Tillis, all Fellows of the SOA (FSAs) and Members of the AAA (MAAAs).

1.2.2 Process Followed

Results were considered for new business only. The projection period studied was for contracts issued on average on January 1, 2010. ATFs were asked to provide underlying cash flows, baseline income statements and balance sheets applying the ED proposal (described in Section 2), certain alternatives to the ED results including both ED and DP views, results from application of current U.S. GAAP and sensitivities to the ED results.

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.

For many of the products modelled, the baseline ED results provided were either based on a single set of expected cash flows (for products with relatively predictable cash flows without significant options or guarantees) or were based on probability weighting (i.e., the results were the weighted average of a number of scenarios). For some of the alternative IFRS results in Section 3, the alternative results 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, 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 actuality, reported investment income in an income statement would be generated from cash flows generated by insurance contract and the amount allocated to the contract's liability (at least where there is no separate account in the case of variable annuities) from the entity's general account, including generated surplus. As the objective of this project is to assess the effect of the ED on the contracts being studied, it was decided to use U.S. GAAP net assets as a common base from which to determine the investment income, for both the U.S. GAAP and the ED assessments. This approach reduces the noise that would have resulted if different amounts of investment income had been reported, although it does not reflect an actual indication of the investment income likely to be generated by the cash flows generated by the contracts. This approach does not affect the measurement of the liabilities themselves.

Most of the modelling used as the basis for the calculation of the research results shown here was prepared by the ATFs, who modelled one or more of the contract types described in Section 1.2.4. The basis for the ATF modelling was derived either from their U.S. GAAP valuation or asset adequacy testing processes. Their results were provided to the researchers, who in turn put them on a common base for consistent illustration and made consistent adjustments, as deemed appropriate for the purpose of this report. The ATFs were asked to provide expected cash flows, reflecting the risk characteristics of the

portfolios modelled and their expected expense levels. Each product type was deemed to represent a single portfolio and cohort for unit of account purposes, as they were assumed to be issued on the same day, January 1, 2010. The ATFs provided the researchers with descriptions of the products modelled and the assumptions used to estimate future cash flows. They also provided resulting U.S. GAAP balance sheets and income statement values, as well as expected cash flows used in the calculation of values resulting from the proposals described in the ED and DP and certain additional relevant information (e.g., cash values and company-generated economic capital, if available), along with variations from these proposals based on either prior alternatives studied by the IASB or the FASB, or alternative experience.

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 taxable items (e.g., expenses such as payroll tax), are reflected as allocated expenses in both expected cash flows and actual expenses, as applicable. Income tax under IFRS is addressed in the determination of deferred tax assets or liabilities (according to IAS 12 or FAS 106, for IFRS and U.S. GAAP, respectively), the calculation of which is outside the scope of this study.

The new business models used assume all products are sold either on or on average on January 1, 2010. Thus, liabilities reported on as of the end of each calendar year are represented by their liabilities at the end of each policy year (normally, a mean or mid-terminal liability method would be used). It was assumed that the end-of-policy year liability would be indicative of the end of calendar year basis. For simplicity, most non-single premium 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 was for thirty years. However, several 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 model results and reasonableness were also discussed extensively with members of the POG to assist in understanding of the underlying business and the resulting IFRS presentation.

Note that the results have not been subject to audit, except to the extent that U.S. GAAP values are those actually used by the entities for which the products were issued; even in this case audits 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. To the extent that the ATFs reported U.S. GAAP financial results, the U.S. GAAP in-force values represent actual reported values anticipated to be in future financial statements. 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 proposed financial reporting models were used to develop income statements and balance sheets for common life, health and annuity contracts offered by U.S. insurers, and two ATFs in insurers in other countries. The contracts studied are of actual products of these companies sold (not theoretically constructed just

for this project), reflecting a mix of risk characteristics that overall represented the business written (for example, by age, gender, and risk classification).

The products studied, including a brief description of their general characteristics, are as follows:

- Life insurance:
    - *Term life insurance.* The term insurance contracts included are level term life insurance with a 20-year level initial premium guarantee period. After twenty years, their premiums increase each year in a manner similar to annually renewable term. They were or are anticipated to be sold to individuals and they do not contain cash values. The amount of premiums after the original contract period are guaranteed, with future premiums potentially set at a higher level at the insureds' then attained age at the discretion of the company up to a maximum amount. Their conversion option was not modelled as part of this project. As a result of the increase in premium in contract year 21, a significant increase in voluntary terminations occurs at about that time.
    - *Participating whole life insurance.* These participating (par) contracts are whole life insurance contracts. They were or are anticipated to be sold to individuals. Their policyholder dividends are based on the contribution principle (i.e., dividends payable to policyholders consistent with their contributions to built-up surplus). No dividends or shares to stockholders are reflected (e.g., no 90/10 split rule between policyholders and shareholders was applicable).
    - *Universal life insurance.* Three varieties of universal life insurance contracts are included in this report. Although these contracts are predominantly flexible premium versions of this product (the amount of premiums paid do not necessarily follow a fixed schedule, although they may be subject to a minimum amount of premiums to remain in force), some single-premium contracts are also included. Minimum guaranteed interest rates are credited that can vary by contract duration, with amounts in excess of that guaranteed also often payable, reflecting actual investment earnings, elements of experience, and competitive conditions. They have monthly cost of insurance and expense loads deducted from their account balance. In most cases actual and expected fees and charges are less than those guaranteed. They include an explicit account balance. Some contracts modelled incorporate a secondary guarantee, many of which are expected to have minimum premiums paid that would be expected to operate similar to a term insurance contract, while others include cost of insurance charges that are level on a percentage of net amount at risk basis. Underlying assets are commingled with the insurer’s other general account assets.
- Annuities:
    - *Fixed (general account) immediate annuities.* These are income payout annuities sold to individuals with no certain periods (e.g., a level monthly benefit is paid and is guaranteed for life to the extent the annuitant or joint annuitant survives). Underlying assets are commingled with the insurer’s general account assets. The amount of income payout is guaranteed. They don’t have a cash value or an explicit account balance.
    - *Variable (separate account) deferred annuities.* These are single-premium contracts sold to individuals. They have a cash value and an explicit account value during the accumulation period that depend upon asset performance. The underlying assets are invested in various separate accounts (whose assets are

invested in various types of financial instruments, e.g., common stocks, all measured at fair value) and a fixed account commingled with the company's general account. Various minimum guarantees are provided in the form of minimum death or living benefits; the product modelled only includes guaranteed minimum death benefits.

- Health insurance:

  - *Medicare supplement insurance.* These contracts are sold to individuals and groups, covering medical expenses of individuals who participate in the U.S. Medicare health insurance (a publicly provided) program that covers those disabled before age 65 and almost all those over age 65, who use these contracts to supplement their Medicare benefits. Their premiums are payable monthly. The liabilities for these contracts typically include a small unearned premium liability (pre-claim liability) and a claim liability, for which the payout period is relatively short in duration. For the purpose of this report and due to its small size, the claim liability is not considered.

  - *Long term care insurance.* These contracts provide various assisted living benefits, predominantly through nursing home and home health care providers. Their premiums are guaranteed renewable, with future premiums that can be modified on the basis of future experience of the contract series, but not on an individual participant basis, with regulatory approval required. They are sold to individuals. Their liability consists of both a contract liability (pre-claims) and a post-claims period liability. Most do not have a cash value.

  - *Supplemental health insurance.* These provide health care benefits that differ based on the specific contract features provided. Three types of contracts are included in this product category, covering health care benefits provided as a result of accidents, cancer, or general medical costs, based on scheduled sets of benefits. Some include a savings element and cash value. They are sold to both individuals and groups.

1.3 Key Measurement Elements of the Exposure Draft

The IASB's ED reflects a single accounting objective for use in measurement of all insurance and reinsurance contracts and is based on a principle that insurance contracts create a bundle of rights and obligations that operate together to generate a set of cash inflows (including premiums) and outflows (include benefits, claims, and expenses) that will arise as the insurer fulfils the obligations associated with the insurance contracts. The measurement approach uses the following building blocks: a current estimate of the future cash flows, a discount rate that adjusts those cash flows for the time value of money, an explicit risk adjustment, and a residual margin. These building blocks are described below.

For short-duration contracts (with a coverage boundary of about one year or less), a modified approach is described in the ED. After discussion with the ATFs, it was concluded that no products modelled met the criteria for the modified approach**;** as a result, the discussion in this paper focuses upon the building block approach.

The following are highlights of this proposal as it applies to the products modelled here, beginning with a description of the measurement building blocks.

Building Block 1: Estimates of future cash flows. This represents an explicit, unbiased, probability-weighted current estimate of future cash flows. This consists of current estimates of liability cash flows, without any "lock-in" feature. This contrasts with many current accounting models (e.g., U.S. GAAP FAS 60 and several U.S. statutory liability regimes) that lock in estimates at contract inception for the life of the contract unless it is

later indicated that there is a premium deficiency at the applicable unit of account level. Changes in current estimates are to be made on a regular basis and affect profit and loss immediately. The approach reflects the perspective of the insurer but, for market variables (mostly in Building Block 2 below), reflects consistency with observable market prices. It should include only those cash flows that arise from existing contracts, that is, within the established boundaries of the contract. The principle as described indicates that all possible scenarios be identified, along with their corresponding probabilities. Nevertheless, paragraph B39 of the ED indicates that a sophisticated approach to determine such scenarios may not be needed or may not be practical in all situations, although the cost of any options and guarantees would be reflected in any event. Acquisition costs are determined on an incremental basis at the contract level, although administrative expenses include directly allocated expenses. As a result, there will be a loss at the time of issue as a result of the incurral of any non-incremental acquisition expenses (as this has been a contentious area, alternative results are given). Overhead expenses are not included in these cash flows either.

Building Block 2: Time value of money. The time value of money is reflected by using discount rates based on market interest rates applied to the cash flows determined in Building Block 1. According to the ED, an insurer's investment strategy or actual investments is not relevant in the choice of the appropriate discount rate, except to the extent that the cash flows depend wholly or partly on the performance of a designated set of assets, for example, in certain participating contracts that follow a rigorous contribution methodology and for variable (unit-linked) products. Rather, according to the ED, discount rates are based on interest rates that are consistent with observable current market prices for instruments with cash flows whose characteristics reflect those of the insurance contract liability, in terms of, for example, timing, currency, and liquidity. It is inconsistent with the ED to combine the risk adjustment and discount rates by means of the use of risk-adjusted discount rates. Guidance provided in the ED is not specific as to which interest rates to use as a basis for these discount rates, such as risk-free government security yields or swap rates.

Building Block 3: Risk adjustment. An explicit and unbiased estimate of an adjustment for risk, consistent with the maximum amount an insurer would rationally pay to be relieved of the risk that the ultimate fulfilment cash flows exceed those expected. Although an implicit or explicit adjustment for risk is common in most financial reporting applications for insurance liabilities, this is somewhat different in involving both an explicit calculation and the entity's view. This risk adjustment is intended to provide for the uncertainty associated with future cash flows. However, it does not reflect credit risk, which is reflected in the discount rate. Risk adjustments do not reflect inter-portfolio diversification and cannot be negative. The ED prescribes the use of one of three methods: a confidence interval method (similar to a value at risk method), a conditional tail expectation method (similar to a tail value at risk method, emphasizing the value attributable to the tail of the distribution), and a cost of capital method (described in Section 2.2.3 of this report).

Building Block 4: Residual margin. This value eliminates any gain at inception of the contract determined on the basis of the first three building blocks. A residual margin 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 for direct business (different rules apply to reinsurance and are not addressed in this project). It is determined at issue on a portfolio basis reflecting the time value of money. It is then run off in a systematic way that best reflects the exposure from providing insurance coverage and accreted with interest -- based either on the passage of time or on the expected timing of incurred claims and benefits, if that pattern differs significantly from the passage of time. For most of the products within the scope of this

report, this pattern differs significantly from the passage of time. Since this margin also reflects the time value of money, in some cases the amount of residual margin can increase over time, if the accretion of interest is greater than the amount released during the period.

Other important measurement features in the ED include the following:

- If a contract contains multiple types of components (e.g., investment and service, as well as insurance), the contract should be unbundled if it meets certain conditions -- the ED principle is based on whether the other component is 'closely related' to the insurance component. Three examples are given in the ED -- one of which is addressed here -- explicit account balances, for which alternative sets of values are given. Neither non-closely related embedded derivatives nor service components included in an insurance contract without commercial substance are incorporated in the products in this report.

- Estimates of cash flows are developed on a direct basis before ceded reinsurance, accompanied by separate ceded reinsurance values. Most but not all of the products modeled in the scope of this project do not reflect any ceded reinsurance. In the few cases where ceded reinsurance was reported on, its size was not significant enough to incorporate. If it had been considered significant a separate ceded reinsurance residual margin would be determined, considering the cash flows of the reinsurance treaty. In addition, a reduction in the ceded asset would have been made based on the non-performance risk of the reinsurer for that situation.

- Cash flows are developed on a pre–income tax basis, as provisions for deferred income tax assets or liabilities are treated separately in IFRS and U.S. GAAP.

- The non-performance (sometimes referred to as 'own credit') risk is not reflected in the ED. This has proven quite unpopular, but is included as a question in the ED.

- Expected renewal premiums within the boundaries of the contracts are recognized in the expected cash flow calculations.

- In participating contracts and those contracts with nonguaranteed elements, participation features and those non-guaranteed elements are recognized on the basis of their expected values. Since the liabilities for these contracts wholly or partly are based on a designated or notional set of assets, discount rates based on corresponding expected investment returns are to be used (alternative results are illustrated for discount rates are derived from (1) expected yields applied to the entire contract, (2) expected yields only applied to policyholder dividends and risk-free rates plus a liquidity adjustment to other cash flows and (3) risk-free rates plus a liquidity adjustment).

The major difference incorporated in the FASB's DP compared with the IASB's ED, is the substitution of a composite margin for the risk adjustment and residual margin described in Section 2.2.4. Other differences exist, but do not have a significant effect in the modelled results here (e.g., treatment of investment contracts with a discretionary participation feature for which none are included here, and a lack of specification of the modified approach applied to short-duration contracts, which are not addressed).

1.4 Study Limitations

The results of the type of modelling conducted in this project can be 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 as applicable to a particular insurer's contracts. The products addressed here are life insurance, health insurance, and annuity contracts and do not include any property and casualty insurance 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 variation in the proposals that have or might be considered in the near future. These were based on both the instructions provided by the researcher and through reading the ED and DP when they became available. It is important to note that the underlying cash flows were in most cases derived using existing financial reporting, pricing, or financial projection software. As a result, the results shown may differ from what insurers would have derived if their models had been developed from scratch to meet the specifications of a final insurance contracts standard.

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 for both IFRS and U.S. GAAP income statement values 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 ED proposal and U.S. GAAP. It should be noted that using this level of assets for investment income may lead to higher or lower investment income than would result from using the corresponding IFRS values or the incremental cash flows generated by the contracts. An example of the effect that the allocation of investment income can have on evaluations of income is given in Section 3.3.5 in which case the income using the basis of the amount of the net U.S. GAAP and ED values are contrasted for participating whole life insurance and in Appendix 7.3.

- 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. As a result, to the extent that options and guarantees were not specifically modeled, liabilities may be somewhat understated in comparison with the expected cash flows resulting from the ED's proposed approach.

  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. For example, the short-term interest rate scenario at that time is quite low relative to historical experience.

- Except for certain experience sensitivity tests conducted by ATFs, 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 on markets, discount rates will change daily. As a result, amounts of income shown appear 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 of difficulty in obtaining relevant information, practical expediency in order to produce this report in a timely manner, applications of the ED that might not be made in practical application (for materiality or other reasons), or where detailed application guidance was not available. An example of this is the following:

    - The values of capital used in the cost of capital method for determining risk adjustments are proxies for the economic capital described in the ED. The application of the cost of capital method used for financial statement purposes will continue to evolve prior to the application of a final IFRS standard. This is the reason that double that amount was included in Sections 3.2 and 3.4 as a sensitivity for two products in this report. Therefore, the risk adjustments included in baseline IFRS results should be viewed as being for illustrative purposes only. It is believed that the values shown likely underestimate the ultimate risk adjustment that will be used in practice, as the values may not fully reflect asymmetric probability distributions, risk aversion, and certain risks such as policyholder behaviour. Thus, this aspect of the study should be viewed with caution. One ATF was able to provide risk adjustments based on the confidence interval and conditional tail expectation methods, shown in Section 3.2.5. However, it should be noted that the risk adjustments shown only relate to variation in mortality in this case; in addition, since a normal probability distribution was used in the calculations, the CTE values in particular are understated. As a result, comparisons of the results of these three methods should be viewed with caution.

2. Overview of Approach

2.1 U.S. GAAP

U.S. GAAP values used were primarily derived from existing internally derived values reported on the basis of currently applicable GAAP standards, as promulgated by the FASB (note: references to U.S.GAAP are made with respect to pre-FASB Codification standard references, with current insurance contract guidance given in topic 944). The periods over which deferred acquisition costs (DAC) are amortized vary by type of contract, reflecting company practice.

Universal life insurance and variable deferred annuity products are measured in accordance with FAS 97 universal-life-type products. Single-premium immediate annuities are measured in accordance with FAS 97 limited payment life products. Term life insurance and health insurance products are measured in accordance with FAS 60, and participating whole life insurance is measured in accordance with FAS 120.

In certain cases, the entities whose business the ATFs modeled do not prepare GAAP financial statements; these values were developed by these ATFs in a manner consistent with these standards. Standards or interpretations that were not effective at the end of 2009 were not reflected, in particular, EITF 09-G.

2.2 Baseline Exposure Draft Approach

To assess the potential effect of the ED proposal, the ATFs were asked to determine baseline IFRS values. In certain instances, modifications from the IASB's preliminary views described in the ED were made where the ED did not provide specific, clear, or complete guidance, or where applicable values could not be reliably calculated (see Section 1.4 for further discussion of these items).

A consistent baseline approach for all products for IFRS reporting illustrations was applied. The fulfillment value approach (described in Section 2.2.1) was used in the derivation of IFRS income statements and balance sheets, with risk adjustments calculated in most cases using a cost of capital approach as described in Section 2.2.2.

Under this approach, liabilities are calculated as the discounted expected value of contractual cash flows. Note that in most cases probability distributions were not explicitly developed and applied to derive the expected value of cash flows, although the assumptions used represent the ATFs' current estimates of experience, believed to be consistent with the intent of the ED proposal as discussed in B39 of the ED. 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.

The investment income earned under both U.S. GAAP and the ED proposal income shown in this report is based on that expected to be earned under the assets underlying net U.S. GAAP liabilities (liabilities less outstanding DAC balance). Thus, the actual investment experience shown in U.S. GAAP and the ED proposal's income statement results shown in this paper are consistent with each other, unless otherwise noted. By including the investment results in this way, the differences in income shown here between U.S. GAAP and IFRS may be better compared. Alternatively, the investment income returns could be generated from assets corresponding to the separate sets of net liabilities (U.S. GAAP and IFRS), generated from market-based yield curves applicable to each. This may have produced different levels of total income related due solely to the investment income, which may distort the comparison of results. However, in some cases, as noted in Appendix 7.3, unexpected IFRS income was generated as a result.

2.2.1 Fulfillment Value

A fulfillment value is 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 fulfils its net obligations and rights under the

insurance contract. 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 expected U.S. GAAP cash flows are identical with those used for IFRS modeling. In addition, other than experience sensitivity runs, actual experience is identical to what was initially expected.

2.2.2 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. These are shown in Appendix 7.1. As a result of discontinuities in the resulting yield curve, it was determined that for use in this report it would be more appropriate to smooth the resulting forward rates, also as shown in Appendix 7.1. An (il)liquidity (often referred to here simply as a 'liquidity premium' or 'liquidity adjustment') adjustment of either 73 or 37 basis points is applied to single premium immediate annuities and all other products, respectively, due to the differences in the relative effect of policyholder behavior on the liquidity characteristics of these products (e.g., single premium immediate annuity contracts cannot be surrendered), as shown in Figure 7.1-1.

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. In order to be consistent with U.S. GAAP values, an amount equal to the net U.S. GAAP liabilities (liabilities less outstanding DAC balance) was used. For a more detailed description of this assignment and examples of the effect of this assignment, see Appendix 7.3.

2.2.3 Risk Adjustment

Risk adjustments for the baseline IASB ED results for all products other than variable annuities have been calculated using a cost of capital approach. As pointed out in paragraphs B84-B90 of the ED, the risk adjustment under the cost of capital method would estimate the cost of maintaining a sufficient amount of capital without which it might be unable to fulfill its obligations and the policyholders would be likely to surrender their insurance contracts.

Given the desire for simplicity and for a consistent approach for all products in the baseline IFRS results, economic capital (the capital required to provide comfort that the insurer obligations would be satisfied) for the risk adjustment calculation has been estimated as a function of current U.S. regulatory capital requirements. In substance, the approach taken is a surrogate for the economic capital for these contracts. Ideally, an economic capital model would be used to determine the appropriate level of capital for each product consistent with the underlying financial reporting structure. The development of such models is a major undertaking in itself and beyond the scope of this project. We have used a factor approach applied to readily available balance sheet values.

A 6% cost of capital rate was used for this application of the cost of capital method. The factors used are generally consistent with 200% of NAIC Risk Based Capital (RBC); note that a different formulation was used in the prior SOA project. 200% is felt to represent a reasonable approach to determine capital as incorporated into the cost of capital methodology for risk adjustments for this purpose. Theory and practice will evolve to use other methods or assumptions in the future. Note that 200% may appear to be too low a level, as it is close to the regulatory minimum level in the United States; however, in the risk adjustment formulation described in the ED, only the non-hedgeable elements (i.e., those risks not reflected in the discount rate or other market inputs) of economic capital should be included. Therefore, 200% was felt to represent a reasonable practical level for the purpose of this project to determine capital as incorporated into the cost of

capital methodology for risk adjustments, although it is recognized that it was selected in part as a practical expedient. It may turn out that this risk adjustment factor may be biased on the low side, as calamity risk and policyholder behavior was not factored into these values. Theory and practice are expected to evolve to incorporate other methods and assumptions.

To provide an indication of the sensitivity of alternative cost values in the cost of capital method, results using twice these factors are also shown in Sections 3.2-15 and 3.4-7. There are currently differing views as to what constitutes a reasonable rate for this purpose. We suggest that further research be conducted in this area.

The factors selected for use are (1) the account value for universal life, (2) the current estimate (that excludes risk adjustments) for immediate annuities, long term care, par whole life, and supplemental health, including claim liabilities for long term care, (3) the face amount (in some countries referred to as 'sum assured'), expressed in terms of $1,000 of insured amount, and (4) the premiums. Further work, outside the scope of this project, is needed to better refine these calculations or the factor selections.

Table 2.2.3-1 shows the economic capital proxy factors used for products whose values are provided in this report, other than variable annuities. Depending on the product line, the current estimate or account value was used.

Table 2.2.3-1. Capital Factors Used to Calculate Capital for Baseline IFRS Risk Adjustments

Product	Baseline Capital Factor		
	Account Value / Current Estimate	Face Amount	Premium
Immediate annuity	2.30%		6.16%
Long term care	15.40%		47.74%
Par whole life	2.30%	0.18%	6.16%
Supplemental health	10.00%		8.54%
Term life		0.18%	6.16%
Universal life	2.30%	0.18%	6.16%

Once the amount of capital is determined, the risk adjustment at issue is calculated as

$$\sum_{t=1} \mathrm{PV}\{ r_c * C_t \},$$

where PV = present value
r_c = pre-tax cost of capital rate that does not vary by time
C_t = economic capital at time *t.*

PV incorporates discount rates that are pre–income tax and is consistent with the discount rates used to calculate the baseline liability before risk adjustment. For the baseline, a 6% cost of capital rate r_c was assumed.

The risk adjustment for the variable annuities modeled in this report was determined on the basis of a conditional tail expectation (CTE 90), as that is the level suggested by current C3Phase2 guidance for regulatory reporting in the U.S. for variable annuities.

The ATF that modeled UL-1 was able to develop a risk adjustment based on the confidence interval (CI at a 95% level) and conditional tail methods (CTE at a 75% level).

These methods assume a normal probability distribution (with a standard deviation of 7% of the mean) and the risk assigned only addresses the mortality risk and thus does not capture the full risk and uncertainty. .

The figures shown in Section 3 indicate a relatively small amount of risk adjustment. This may be due in part to the approximations included 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.

2.2.4 Residual Margin (IASB ED) and Composite Margin (FASB DP)

The residual margin eliminates any gain at inception of the contract 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 it 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 of the products within the scope of this report, this pattern differs significantly from the passage of time. It is significant to note that the residual margin does accrete with interest, which can lead to an increase in the 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 and separately illustrated in this report, eliminates any gain at inception of the contract determined on the basis of the first three building blocks. It is equal at the inception of the insurance contract to the sum of the risk adjustment and the residual margin if there is a gain at issue. 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 (note that, except in the experience sensitivities, actual experience is assumed to be equal to that originally expected; thus in most figures in Section 3, the balance of the margin is not updated). Nominal values (i.e., no present values) are reflected, according to the following formula:

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

2.2.5 Unbundling

The ED provides for unbundling of a contract with multiple elements when a non-insurance related component is not closely related to the insurance component. If this condition is met, the financial or service component is unbundled and measured separately. During the run up to the ED, some observers have been uncertain which contracts would meet these conditions and how they would be measured. To illustrate the effect of this provision, universal life and variable deferred annuities have been modeled here on both a bundled and unbundled approach.

If unbundled, instead of using the basic building block approach for the entire contract as described above, the liability for the unbundled contract, would consist of (1) the investment (deposit) component, which is taken to be the current account value without deduction of a surrender charge and (2) the insurance component. The insurance component is calculated here using the building block approach, but instead of using total cash flows uses a modified set of policy cash flows. The current estimate, which is the present value of all expected premium loads, expense loads, surrender charges and cost of insurance charges less death benefits (on a net amount at risk basis) and expenses, is calculated using the same discount rates as in the bundled approach. The risk

adjustment is also calculated as described for the bundled approach. The initial residual margin of the insurance component, if needed, considers the present value of insurance cash flows less the risk adjustment.

2.3 Sensitivity Analysis

In addition to the presentation of results based on baseline and alternate IFRS bases, this report includes results from several sensitivity analyses. Some of these sensitivities were applied to all products, while others were conducted only on selected products.

Sensitivity tests requested of the ATFs and shown in Section 3 of this report on the baseline IFRS approach were:

- Double the level of capital reflected in the cost of capital risk adjustment method

- Use of a plus or minus 100 basis point parallel shift of the December 31, 2009 risk-free yield curve plus a level liquidity adjustment that varies by product as described earlier. In addition, if a non-U.S. company, provide the U.S.-based discount rates.

- Use (1) portfolio incremental acquisition costs in expected cash flows, if practical, and (2) no acquisition costs in expected cash flows.

- Use a risk adjustment method other than the designated cost of capital method, if practical. It turned out that only one ATF was able to apply other methods within the time frame allowed for submitting results of their modeling. This is in addition to variable annuities for which the CTE approach for their baseline risk adjustment approach was used.

Product specific sensitivity tests included were:

- *Account value products (universal life and variable deferred annuities).* Alternative unbundling approaches were applied, as if it was required to unbundle the product. One alternative is to calculate the liability as if was bundled, and simply use the account value as the deposit component. The other alternative is to unbundle according the methodology described in the ED.

- *Participating whole life.* Expected future investment returns net of expected credit margins were used as the discount rates for its base case. An alternative set of discount rates was applied similar to other products. In addition, a split discount rate variation was applied, with expected returns applied to participating dividends and the baseline discount rates applied to the other cash flows.

- *Variable annuities*. Alternative investment income projections reflecting a 100 basis point increase in the earned rates and discount rates.

- *Term life and universal life.* A one-time deterioration that occurs at the end of year 3 and only affects the discount rates (not the investment income) by increasing them by 200 basis points from that point on. This might be considered indicative of a decrease in own credit standing if that was included in the discount rate.
.
- *Term Life, Universal Life.* A shift of 150 basis points after year 5 effecting both the discount rate and future investment income.

- *Health*. Decrease the morbidity rate by 15% throughout the contract, while the change in assumption was not recognized until year 3.

3. Financial Statement Results

This section presents financial statement values primarily in graphical form that were generated from the modeling results for individual product categories. Two important notes regarding both U.S. GAAP and IASB ED results are the following:

- The income statement includes investment income according to a consistent set of rules across product groups, described in Appendix 7.3.

- It is assumed that actual experience subsequent to the measurement dates (new business issued) equals that expected (except for Section 3.8.6, which illustrates the effect of a change in morbidity experience and expectations) and certain investment income sensitivities in 3.1-11 and 3.2.17.

Before financial statement results are given, a separation of significant categories of cash flows are provided. This is followed by the liabilities determined under the U.S. GAAP, IASB ED proposal and the FASB DP proposal. These are then followed by the results of applicable income statement results and the components underlying the ED based liabilities and income. The last part of each subsection is devoted to analytical and experience sensitivities, focusing on ED income statements.

As indicated in previous sections of this report, the projection results are shown over a thirty-year period (for participating whole life also for a longer period). This was done in part to be consistent across all products modeled. Note that in some cases the projections were only made for that period. Because many companies utilize a longer DAC amortization period for certain life insurance products (often forty or more years) there is an outstanding liability and DAC balance at the thirtieth year. Where projections were performed over the contracts' lifetime, DAC was usually amortized over that longer period. No adjustments were made to reflect this continued existence. Many of the products have non-deferrable acquisition costs, which may result in a year one U.S. GAAP loss or lower ED income (to the extent of non-incremental acquisition costs) than might be otherwise be reported.

In the baseline ED examples, the first-year results include the gain at issue in all the income comparisons that follow. The cash flows underlying the baseline ED results are the same as the U.S. GAAP cash flows. The expected present value portion of ED liability (before risk adjustment) is based on the present value of expected cash flows. For the baseline values, the present values were determined using the risk-free plus applicable liquidity rates (shown in Appendix 7.1). Alternative discount rates are used as sensitivities for participating whole life in Section 3.3.5. The risk adjustment under IFRS was calculated using the cost of capital formula described in Section 2.2.2, unless otherwise indicated. The income shown in the first policy (contract) year includes any loss at issue and any non incremental acquisition expenses.

The figures in Section 3 show the amount of income, liabilities or components of liabilities on the vertical (y) axis, as applicable, and time since issuance of the contracts, set at January 1, 2010, on the horizontal (x) axis. In each case, a description of the calculation precedes the figure or table that describes the results shown. In addition, to provide perspective for each figure, the amount of first-year premium or deposit related to the product shown is shown. The premiums and values were normalized, that is, were not the amounts provided by the ATFs, but are otherwise a multiple of what was provided by the ATFs.

A table of values at time 0 and the full first contract year is shown prior to the figures in each of the product sections. The purpose of these tables is to provide further clarity regarding what occurs during the first contract year of the baseline cases.

In the following sections and in the figures, the following definitions and conventions are used:

- References to 'IFRS' relate to baseline IASB ED values modeled, 'IASB ED' to the IASB Exposure Draft *Insurance Contracts* proposal and 'FASB DP' to the corresponding Discussion Paper proposal promulgated the FASB.
- References to 'GAAP' or 'US GAAP' relate to values prepared for use in current U.S. GAAP financial statements.
- Income components (for unbundled universal life and variable annuities) are represented by 'Fees' that includes fee income and net interest margin on general account assets as investment income; 'Net Benefits and Claims' reflects the actual benefits paid and the change in liabilities; 'Net Expenses' refers to all expenses, including acquisition and maintenance expenses. Other labels used, including cash flow and income components (for other contract types) are self-evident.

3.1 Term Life Insurance

The term insurance contracts included are level guaranteed premium term life insurance with a twenty-year initial coverage period. After twenty years, their premiums increase each year in a manner similar to annually renewable term. They were or are anticipated to be sold to individuals. They do not contain cash values and so there are no surrender benefits. The amount of premiums for the original contract period (twenty years) is guaranteed, with subsequent premiums potentially set at a higher level at the then attained age basis and, in certain cases, at the discretion of the company up to a maximum amount. As a result of the increase in premium in year twenty-one, a significant increase in voluntary terminations occurs at that time, with mortality anti-selection anticipated as a result. The conversion option included in some of these contracts is not a significant feature of these contracts, and thus not considered in the values shown here.

For U.S. GAAP, balance sheets and income statements were developed based on FAS 60, with liabilities equal to the benefit and expense liabilities. The cash flow projections were based on best estimate assumptions, while the liabilities included provisions for adverse deviation (PADs) as appropriate. Since it was assumed that the products were issued on a profitable basis and that no adverse change in expectations occurred, the projections assume that no recoverability issues arise and that no premium deficiency reserve is needed.

The cash flows underlying the IFRS results were based on the U.S. GAAP cash flow projections: that is, the probabilistic weighted average cash flows required for IFRS were assumed to be equal to the best estimate scenario used to produce GAAP cash flows. The baseline IFRS liability is based on the present value of cash flows.

To provide insight as initial income at time of issuance (either due to a loss at issue or due to non-incremental to the contract acquisition costs), values for the initial value and first contract year are provided for baseline results in the following.

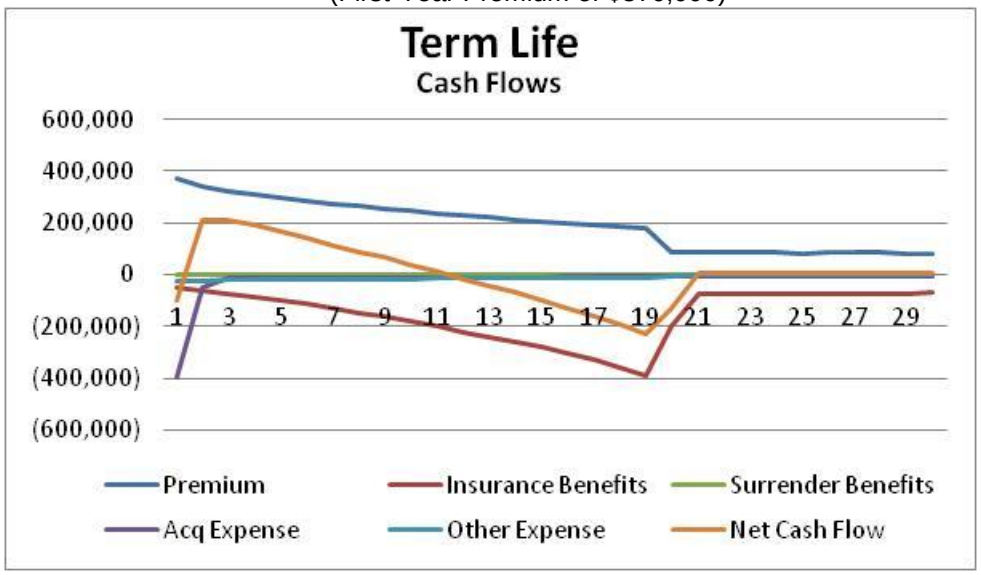
Term Life Insurance	Time 0	End of Year 1
Current estimate	- 526,976	- 629,774
Risk adjustment	83,050	75,323
Residual margin	443,926	439,232
Composite margin	526,976	495,944
Liability -- IASB ED	0	- 115,219
Liability -- FASB DP	0	- 133,830
Non-incremental acquisition cost	0	
Incremental-to-the-contract acquisition cost	397,297	

3.1.1 Cash Flow Components

Fundamental to the measurement of the liability of these term insurance contracts are the cash flows shown in Figure 3.1-1 that shows the expected incidence and amount of the major elements of expected cash flows. These are insurance cash flows and exclude the investment income from the assets backing the insurance liabilities. The inforce decreases significantly at contract year 20 when the premium rate jumps.

Figure 3.1-1.

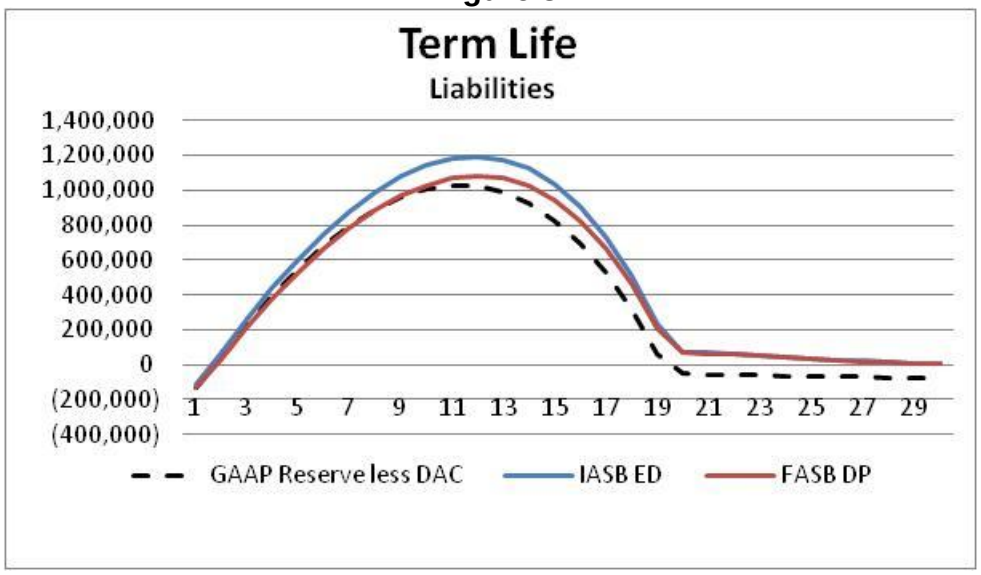
(First-Year Premium of $370,000)



3.1.2 Liabilities for U.S. GAAP and baseline IFRS

Figure 3.1-2 provides a comparison of the liabilities (net of DAC asset) for U.S. GAAP and for the IASB ED and FASB DP variation. U.S. GAAP liabilities are negative where the outstanding DAC asset is greater than the corresponding liability.

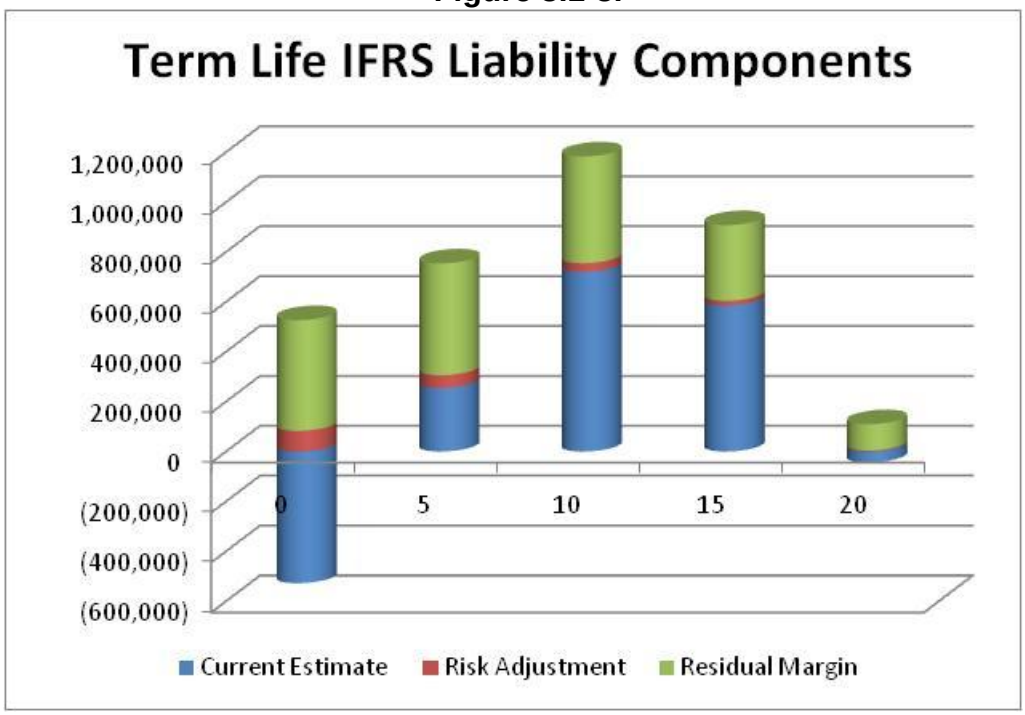
Figure 3.1-2.



3.1.3 IFRS Liability Components

Components of the ED liability for selected contract durations are shown in Figure 3.1-3 to assist in understanding the magnitude of the components in the liability. The risk adjustment component is minor relative to the residual margin for this product, and under the convention using the cost of capital for risk adjustment using the factors used in this study.

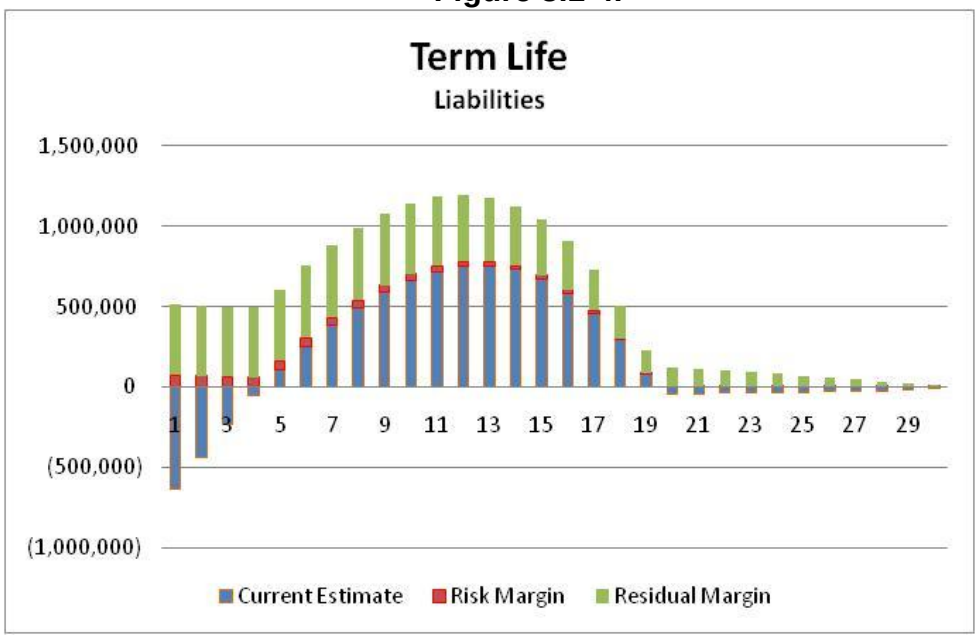
Figure 3.1-3.



3.1.4 IFRS Liability Components

Components of the IFRS liability are shown in Figure 3.1-4 on an annual basis as opposed to the select periods shown above.

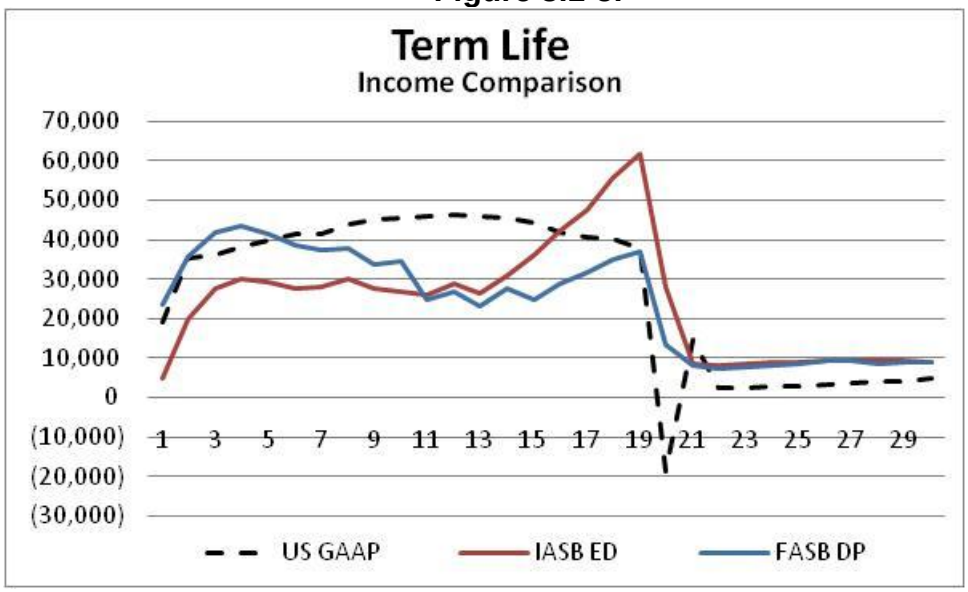
Figure 3.1-4.



3.1.5 Income Statement Comparison and IFRS Components

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.1-5. An interesting point is the peak that occurs in year 20, which is due to the relatively large increase in the residual margin amortization in contract years 13 through 20.

Figure 3.1-5.



The Figures 3.1-6 and 7 below show the component parts of IFRS income splitting them in two ways. In Figure 3.1-6 the items shown are not aggregated in the year, but reflect the magnitude of each part to the income in the year. Note the change in CE offsets the cash flows, leaving as income the change in margins and investment income in excess of that attributed to the change in CE. Figure 3.1-7 nets the parts into

the change in margins and net cash flows including investment income. This Figure illustrates the release of margin pattern based on the IASB ED method.

Figure 3.1-6.

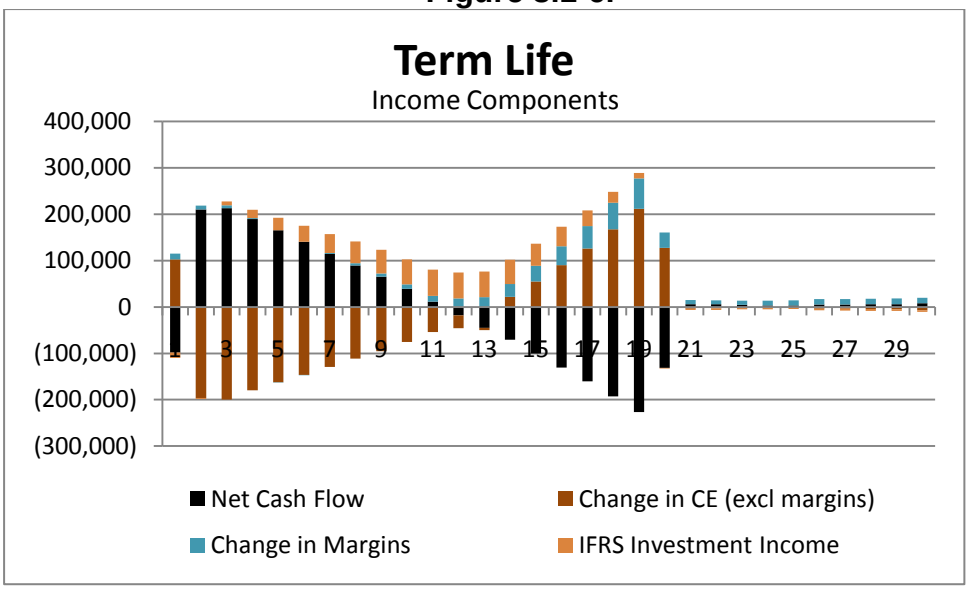
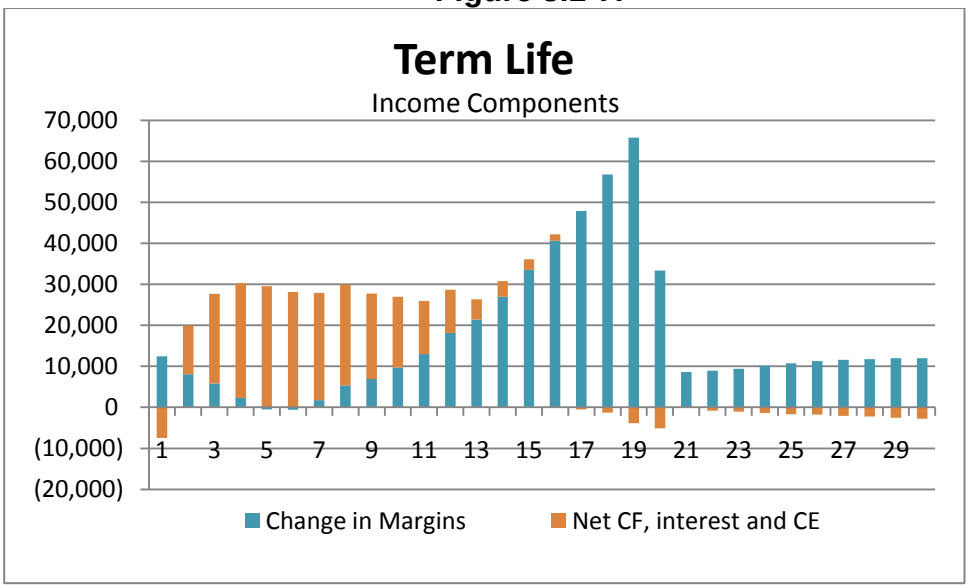


Figure 3.1-7.



3.1.6 Sensitivities

Several sensitivities are shown in this section to illustrate the effect of: (1) not including any acquisition costs in the expected cash flows, (2) a change in the discount rates, (3) a simultaneous change in the discount rates not offset by a change in investment income, (4) a permanent shift in the discount rates and investment income, and (5) amortization of the residual margin by coverage amount rather than by expected cash flows.

Figure 3.1-8 shows the sensitivity of income to an exclusion of all acquisition costs in the CE in the IASB ED or FASB DP methods. The loss that follows in year 1 due to actual acquisition costs being charged and not captured in the CE leads to a larger

residual or composite margin that in turn results in higher later year profits as this margin is subsequently released.

Figure 3.1-8.

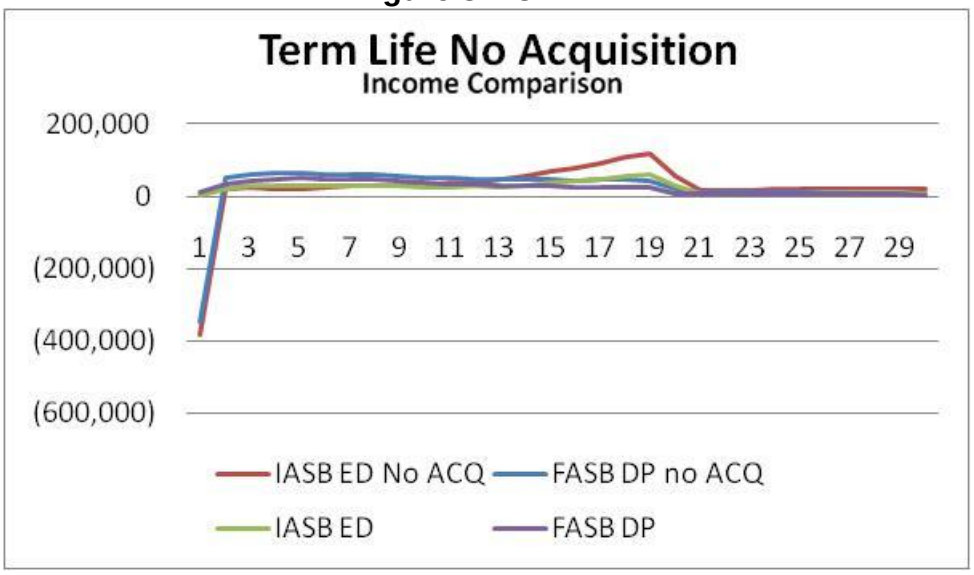


Figure 3.1-9 shows the sensitivity of income pattern to a shift in the discount rate of +/- 100 basis points without reflecting any changes to the underlying cash flow components.

Figure 3.1-9.

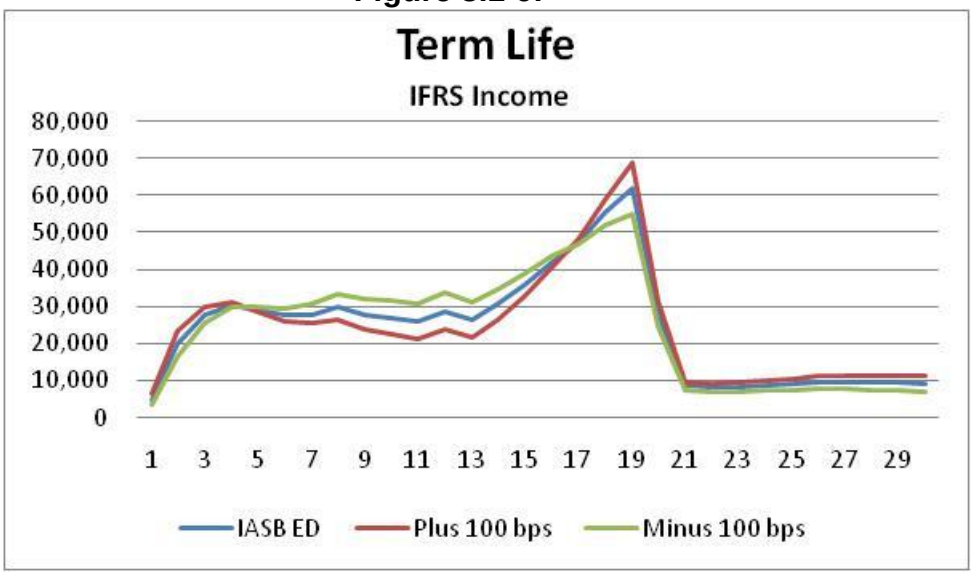


Figure 3.1-10 shows the effect on income of a change in discount rates of 200 basis points (not offset by an increase in investment earnings) at the end of year 3.

Figure 3.1-10.

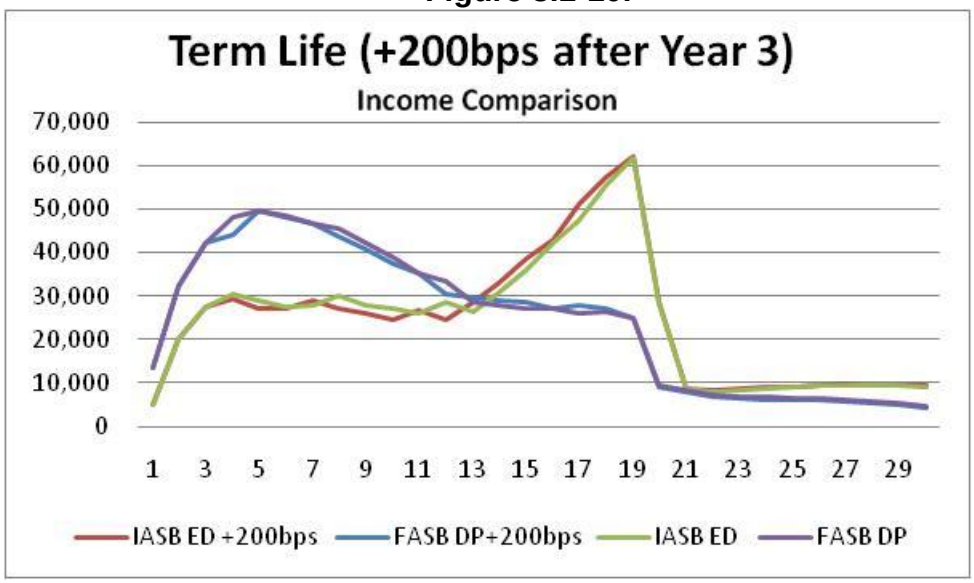


Figure 3.1-11 shows the effect on income of a change in discount rates of 150 basis points (and an increase in investment earnings) at the end of year 5 through a permanent shift in the expected yield curve after that date.

Figure 3.1-11.

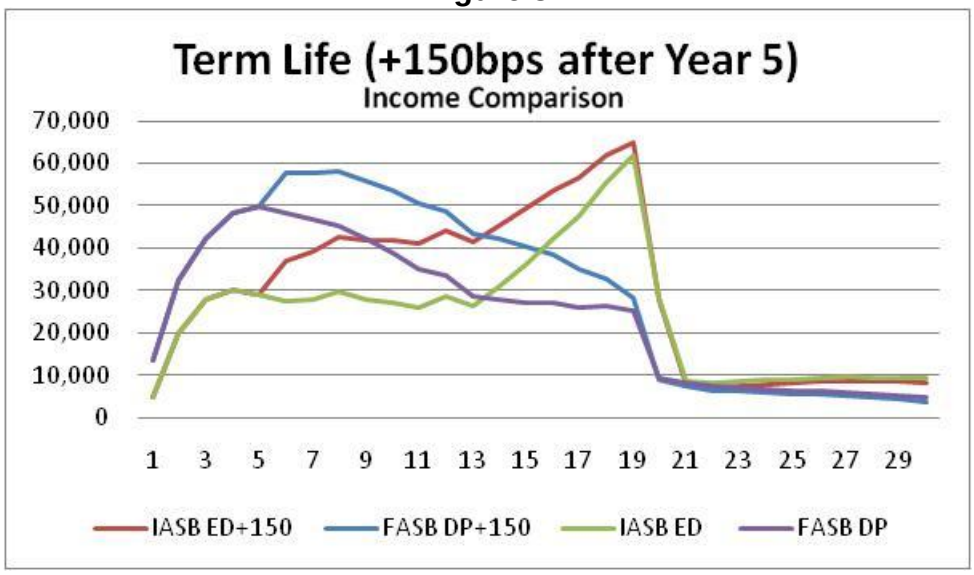
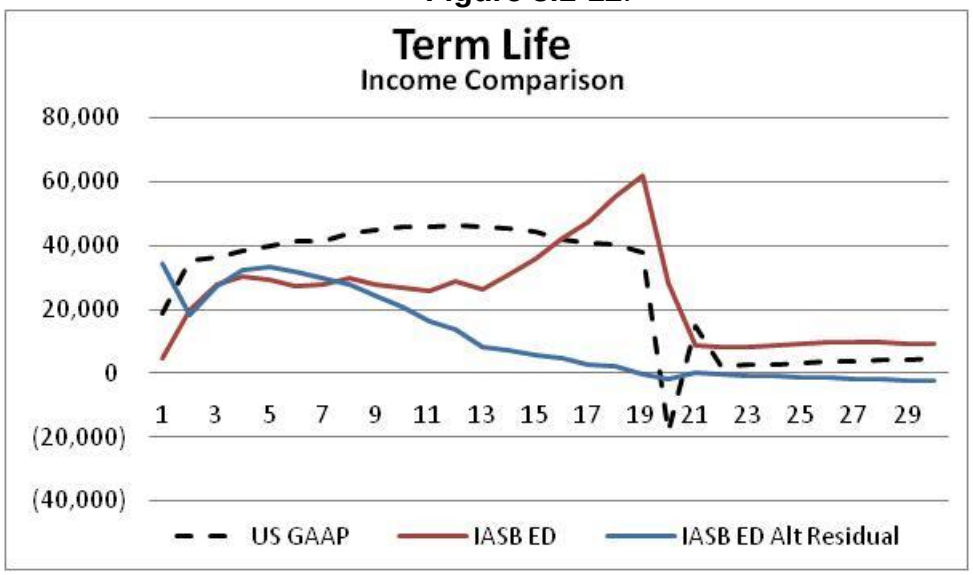


Figure 3.1-12 shows the effect on income of a different method of amortization of the residual margin. For the 'Alt residual' illustration, the residual margin is amortized based on the present value of face amount, or insurance in force. The result causes a quicker release of the residual margin and thus higher income than if the margin is released based on benefits paid.

Figure 3.1-12.



3.2 Universal Life Insurance

Although the universal life insurance contracts included here are predominantly flexible premium versions of this product (the amount of premiums paid do not necessarily follow a fixed schedule, although they may be subject to a minimum amount of premiums), some single-premium contracts are also included. Minimum guaranteed interest rates are credited that can vary by contract duration, with amounts in excess of that guaranteed also often payable, reflecting actual investment earnings, elements of experience, and competitive conditions. They have monthly cost of insurance and expense loads deducted from the account balance. In most cases actual and expected costs and charges are less than those guaranteed. They include an explicit account balance. Some contracts modelled incorporated a secondary guarantee, while others included cost of insurance charges that were level (on a percentage of net amount at risk basis). Underlying assets are commingled with the insurer's other general account assets.

Values for several major types of universal life insurance are shown separately in this section:

- UL-1. A universal life insurance product with a secondary guarantee (a guarantee that it will not lapse if a specified number of premiums are paid).

- UL-2. About eighty percent of the universal life insurance contracts include a level cost of insurance charges (across contract durations), with the remainder with increasing cost of insurance by attained age.

- UL-3. The universal life insurance contracts included are primarily heavily funded (single premium and 7 pay variations).

For U.S. GAAP, balance sheets, deferred acquisition expenses, and income statements were developed based on FAS 97, with liabilities equal to the account value and SOP 03-1 liabilities and a deferred acquisition cost asset. The projections were based on best estimate assumptions, such as rates of mortality and lapse. Since it was assumed that the products were issued on a profitable basis and that no adverse change in expectations occurred, the projections assume that no recoverability issues arise and that no premium deficiency reserve is needed.

The cash flows underlying the IFRS results were based on the U.S. GAAP cash flow projections: that is, the probability weighted average cash flows required for IFRS

were assumed to be equal to the best estimate scenario used to produce U.S. GAAP results. The base results shown treat the products as if they were determined to be a bundled product (a bundled and unbundled version of the liabilities are shown for UL-1 and UL-2). An unbundled view is presented also for comparison. The baseline IFRS liability is based on the present value of cash flows.

Two bases for measurement were applied for these contracts: bundled and unbundled. The former applies the full building block models to these contracts; the latter applies an unbundled approach, with the deposit element equal to the account value. Unbundling was described in Section 2.2.5.above. In most sections below both the bundled and unbundled Figures are shown without renumbering.

To provide insight as initial income at time of issuance (either due to a loss at issue or due to non-incremental to the contract acquisition costs), values for the initial value and first contract year are provided for baseline results in the following.

UL-1	Time 0	End of Year 1
Current estimate	- 25,974,146	- 32,208,129
Risk adjustment	4,010,527	3,714,780
Residual margin	21,963,619	21,956,610
Composite margin	25,974,146	24,861,202
Liability -- IASB ED	0	- 6,536,739
Liability -- FASB DP	0	- 7,346,927
Non-incremental acquisition cost	2,732,564	
Incremental-to-the-contract acquisition cost	8,197,691	

UL-2	Time 0	End of Year 1
Current estimate	1,143,736	- 1,216,052
Risk adjustment	218,196	207,416
Residual margin	0	0
Composite margin	0	0
Liability -- IASB ED	1,361,932	-1,008,636
Liability -- FASB DP	1,143,736	-1,216,052
Non-incremental acquisition cost	0	
Incremental-to-the-contract acquisition cost	2,335,564	

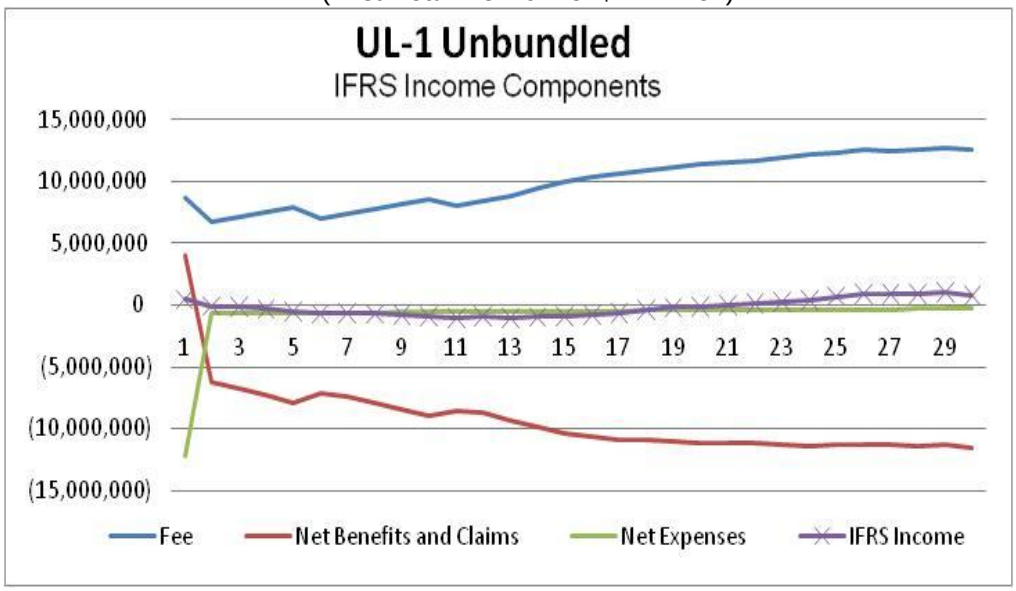
UL-3	Time 0	End of Year 1
Current estimate	- 9,556,883	- 6,970,098
Risk adjustment	1,185,313	1,145,705
Residual margin	8,371,570	8,269,820
Composite margin	9,556,883	8,593,239
Liability -- IASB ED	0	2,445,426
Liability -- FASB DP	0	1,623,140
Non-incremental acquisition cost	11,200	
Incremental-to-the-contract acquisition cost	4,732,050	

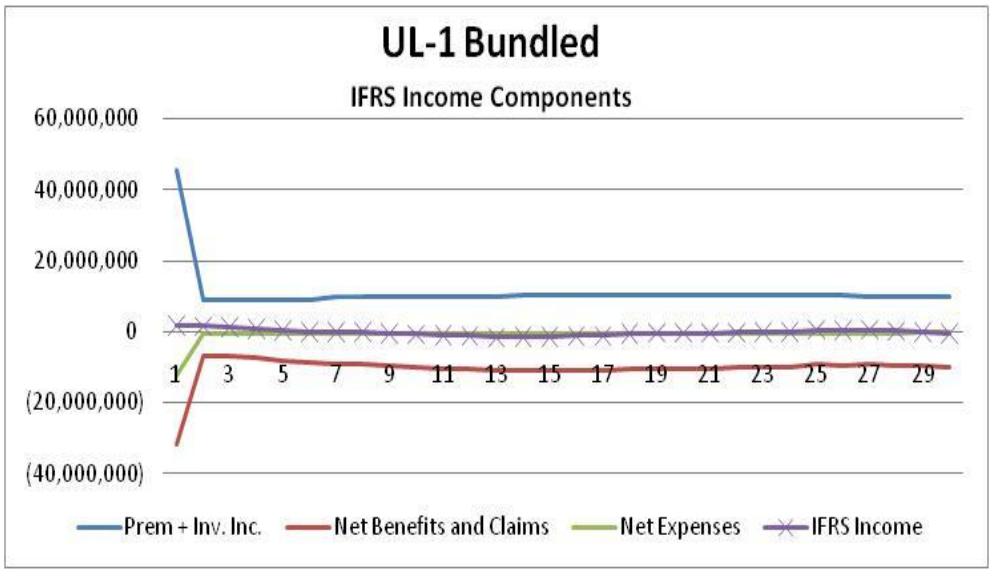
3.2.1 Cash Flow Components -- UL-1

Fundamental to the measurement of the liability of these universal life insurance contracts shown in Figure 3.2-1 are (1) fee and other elements for the insurance

component of the unbundled version and (2) cash flow components for the bundled version. The expected incidence and amounts of the major elements of expected cash flows are shown, as well as the total ED income. For the unbundled Figure the fees component represents cost of insurance (COI) charges and other charges/fees as described above and also includes investment income. The bundled Figure includes premium and investment income in the first item. The relatively large first year premium indicates a significant proportion of these contracts are sold as single premium contracts.

Figure 3.2-1.
(First-Year Premium of $44 Million)

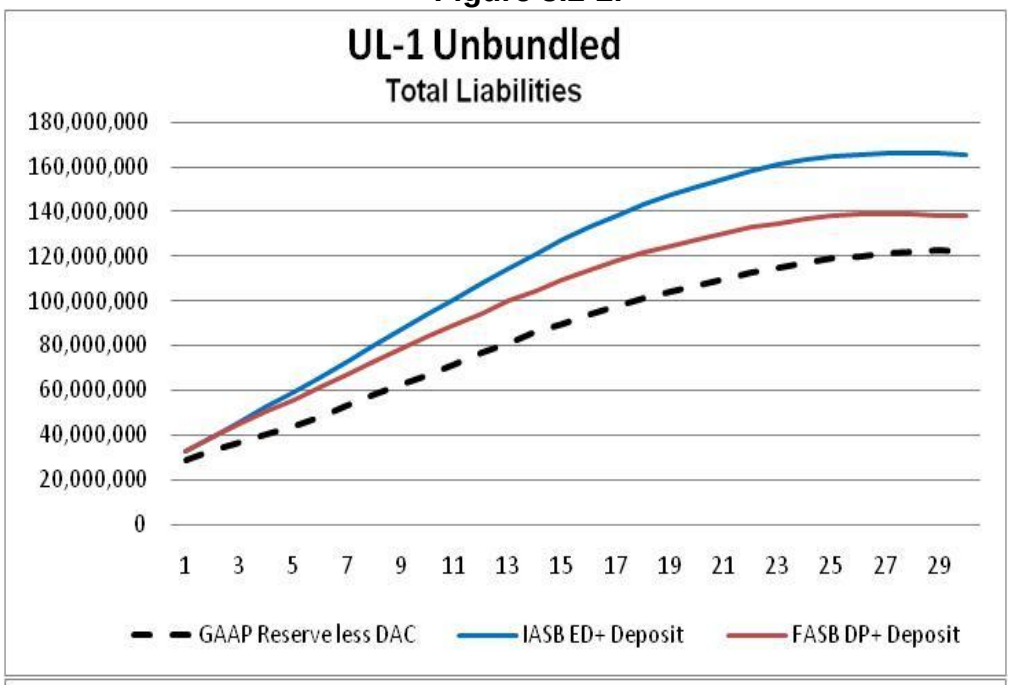


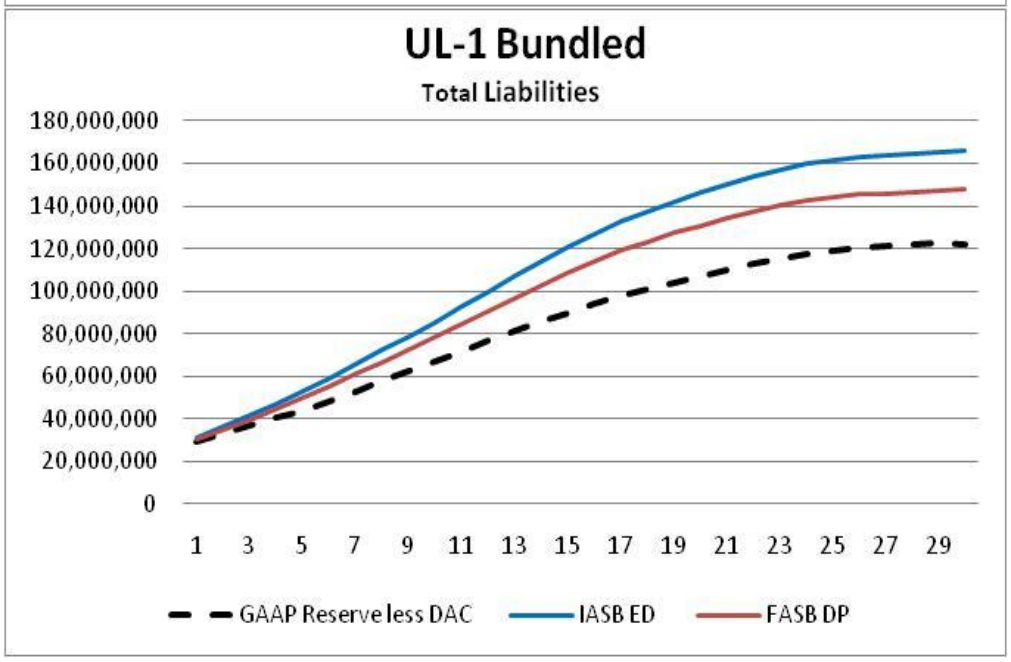


3.2.2 Liabilities for U.S. GAAP and baseline IFRS -- UL-1

Figure 3.2-2 shows a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP variation. Note for the unbundled Figure results the deposit account is included in the total liability. The difference between the ED and DP variation is primarily due to the accretion of interest on the residual margin.

Figure 3.2-2.

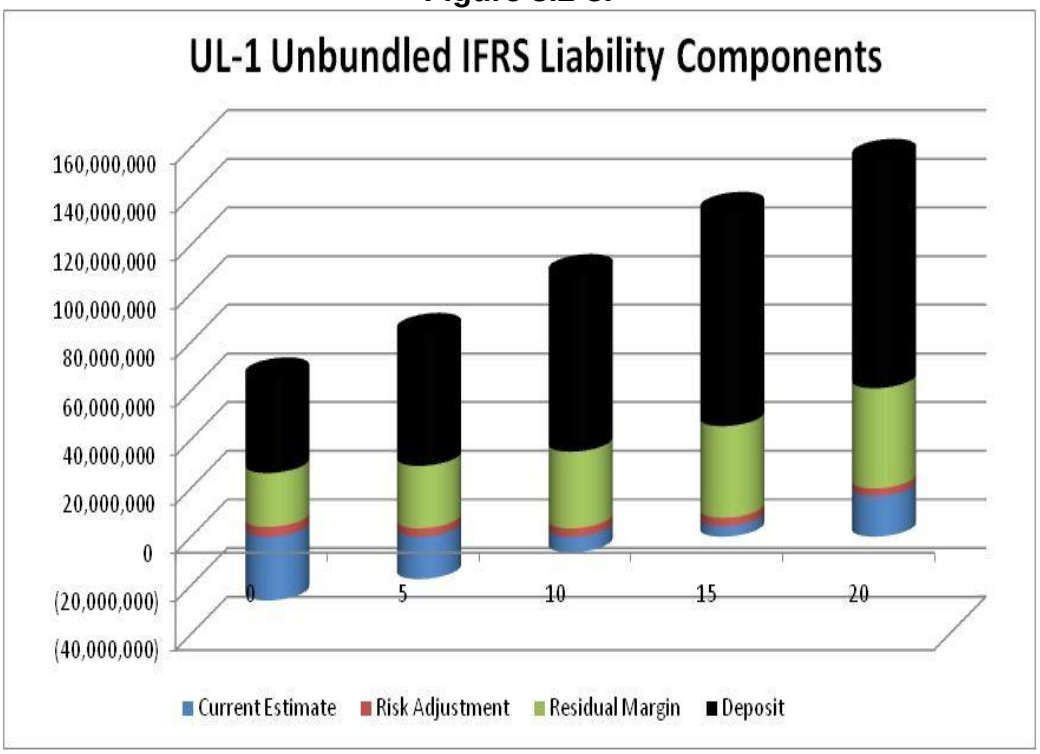


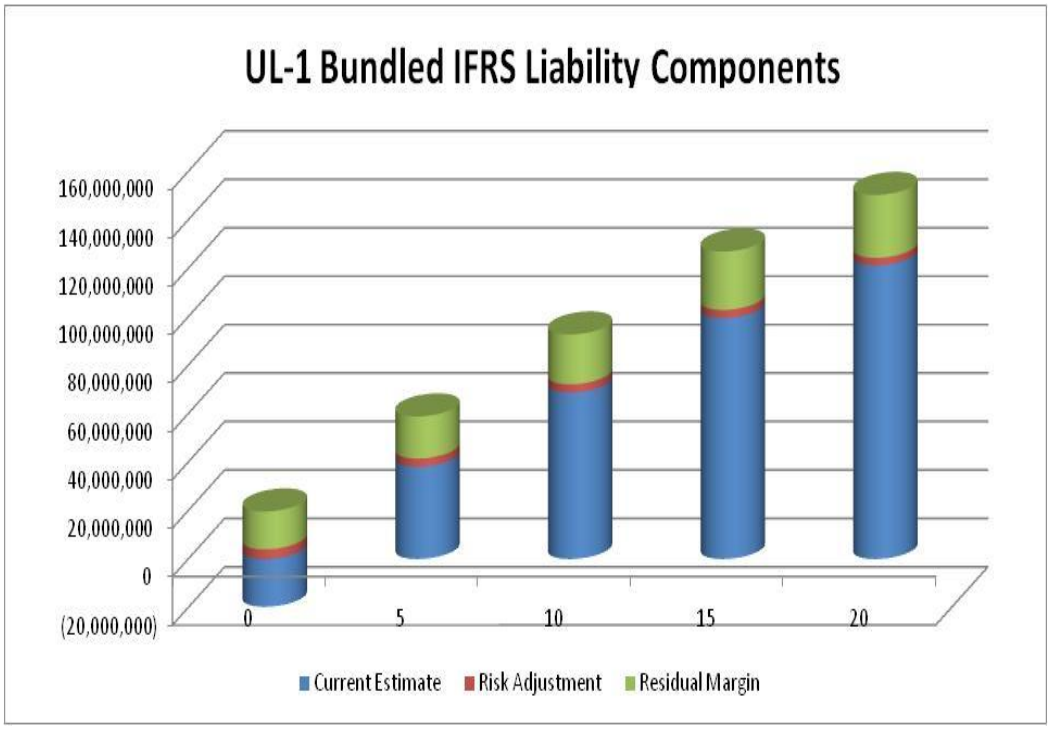


3.2.3 IFRS Liability Components -- UL-1

Components of the ED liability at selected durations are shown in Figure 3.2-3 to assist in understanding the magnitude of the components in the liability. The risk adjustment component is minor relative to the residual margin for this product, and is determined under the convention using the cost of capital for risk adjustment used in this study. The residual margin grows through accretion of interest being greater than its amortization for many years.

Figure 3.2-3.



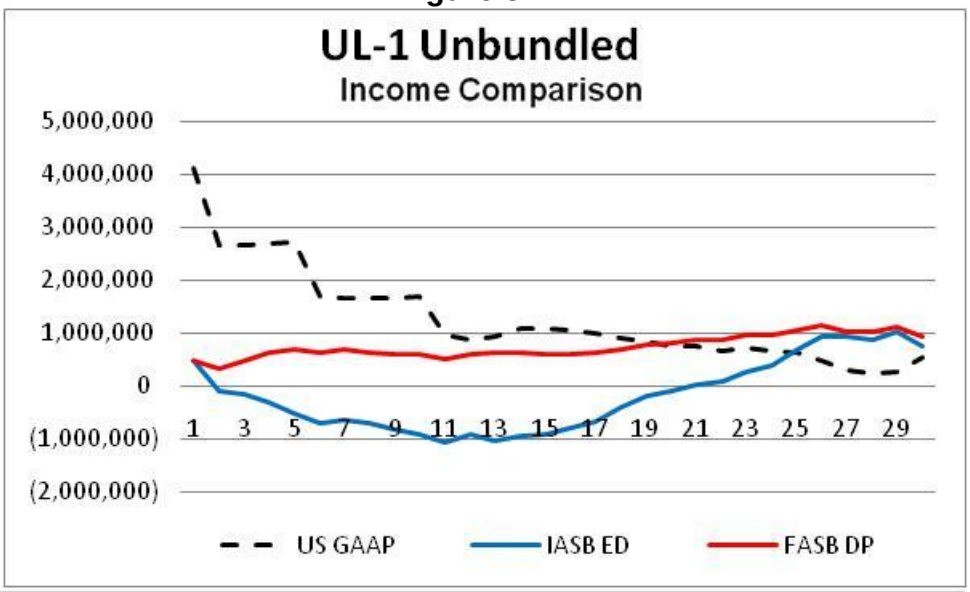


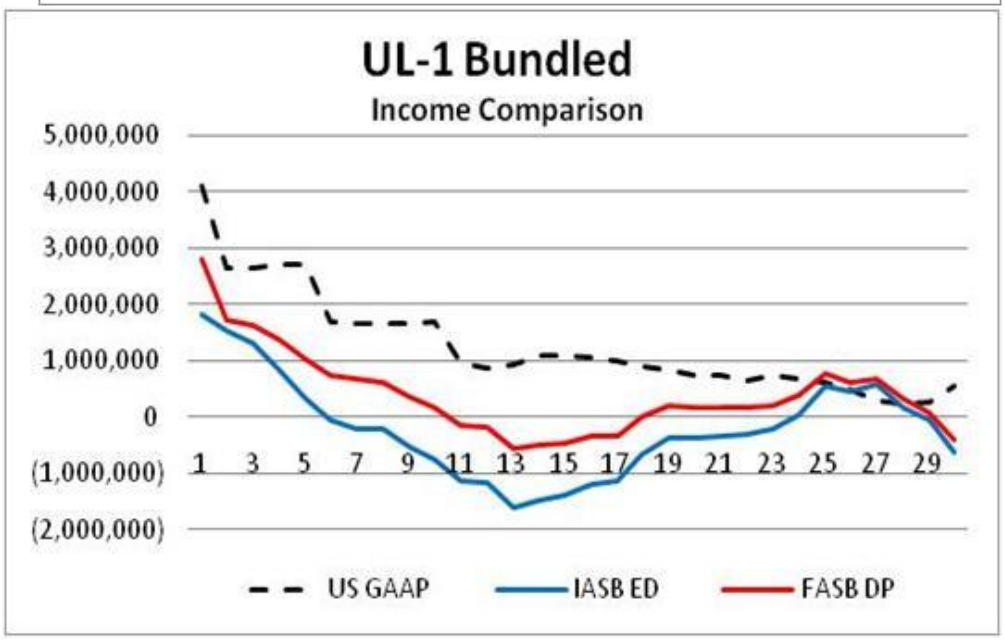
3.2.4 Income Statement Comparison -- UL-1

A comparison of income statements under U.S. GAAP, the ED and the DP variation is shown in Figure 3.2-4. The US GAAP results reflect other policy loads that decline in years 5 and 10.The ED results reflect the accretion of interest on the residual

margin in the early years of the model whereas the DP margin is released without interest.

Figure 3.2-4.



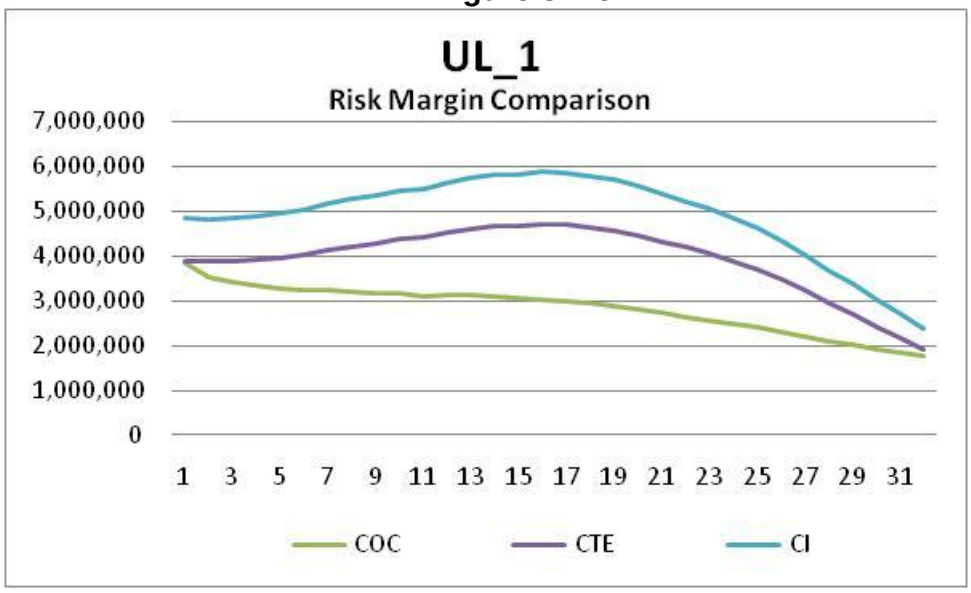


3.2.5 Sensitivities -- UL-1

Figure 3.2-5 shows the sensitivity of the risk adjustment under the three suggested risk adjustment methodologies. It should be noted that, from the perspective of this paper, any shift in the risk adjustment would be offset by a corresponding shift in the residual margin at the time of issue, with subsequent measurement differing depending on the method of release or amortization of the adjustment and margin. And, as the paper portrays actual results equal to expected, the income effect of this shift is zero. The confidence interval (CI) method was applied using a 95% confidence interval, while the conditional tail expectation (CTE) method was applied using a 75% CTE. The CI and COC method values at time 0 were identical, but this was based on coincidence and not

design. Note that these methods assume a normal probability distribution (mean equal the expected value and a standard deviation of 7% of the mean) and the risk assigned primarily addresses the mortality risk and thus does not capture the full risk and uncertainty associated with UL-1. It does indicate that the release of risk adjustment in this case is faster applying the cost of capital method as used in this paper than either the CI or CTE methods.

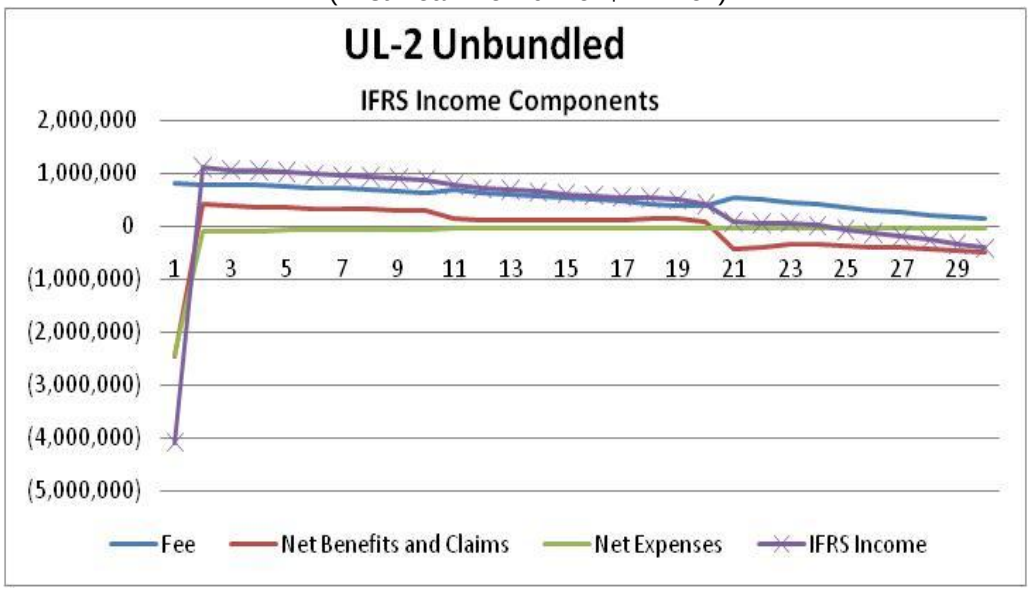
Figure 3.2-5.

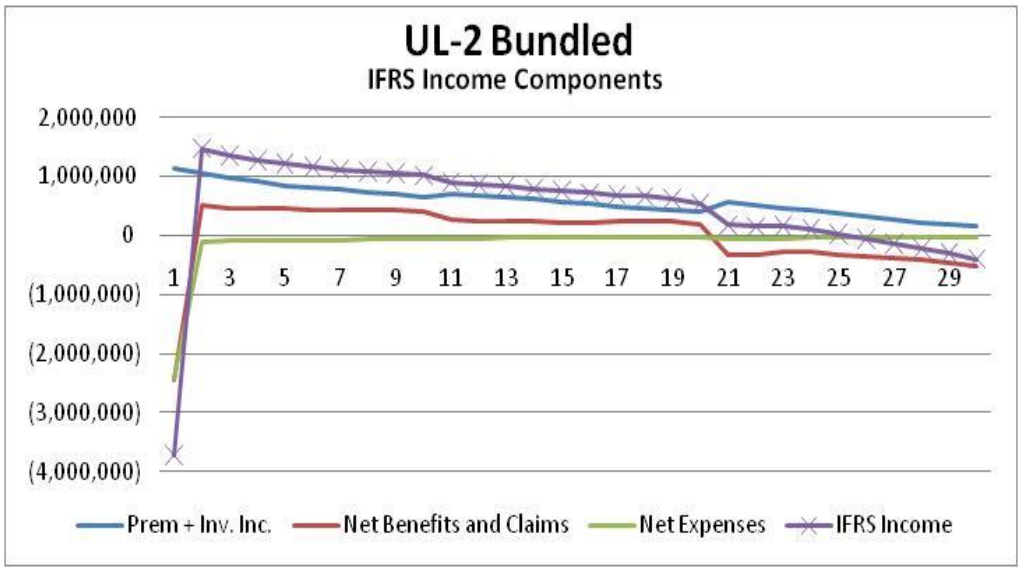


3.2.6 Cash Flow Components -- UL-2

Fundamental to the measurement of the liability of these universal life insurance contracts shown in Figure 3.2-11 are (1) fee and other elements of the insurance component for the unbundled version and (2) cash flow components for the bundled version. The expected incidence and amounts of the major elements of expected cash flows are shown, as well as the total ED income. For the unbundled Figure the fees component represents cost of insurance (COI) charges and other charges/fees as described above and also includes investment income. The bundled Figure includes premium and investment income in the first item. For the unbundled IFRS results, the loss in year one relates to the fact that there was a loss at issue for the contract.

Figure 3.2-11.
(First-Year Premium of $2 Million)

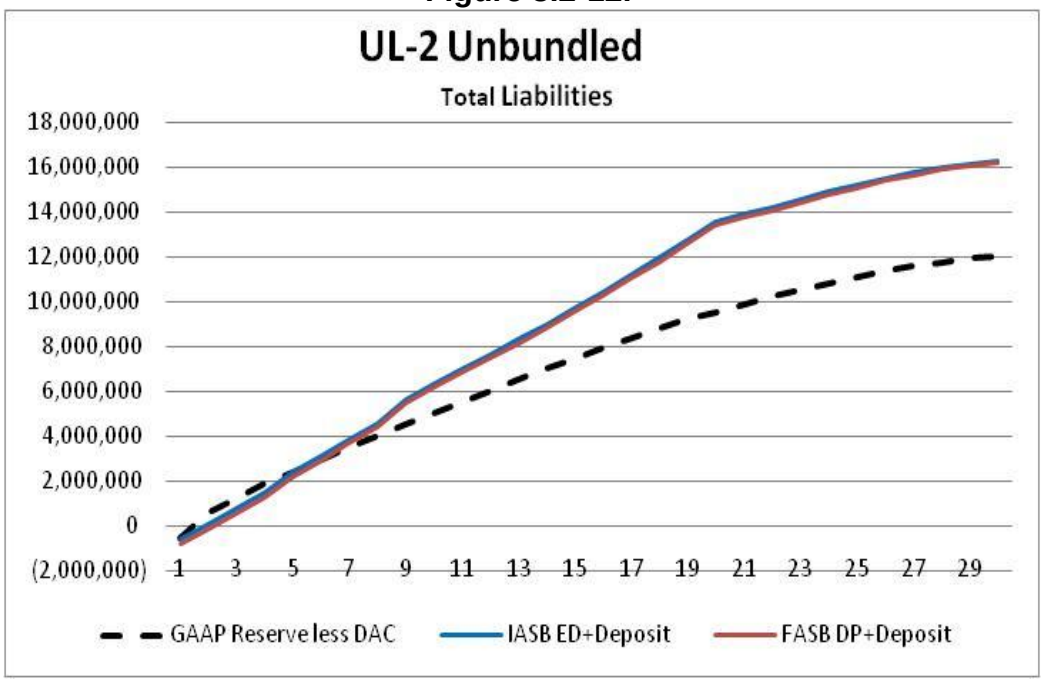


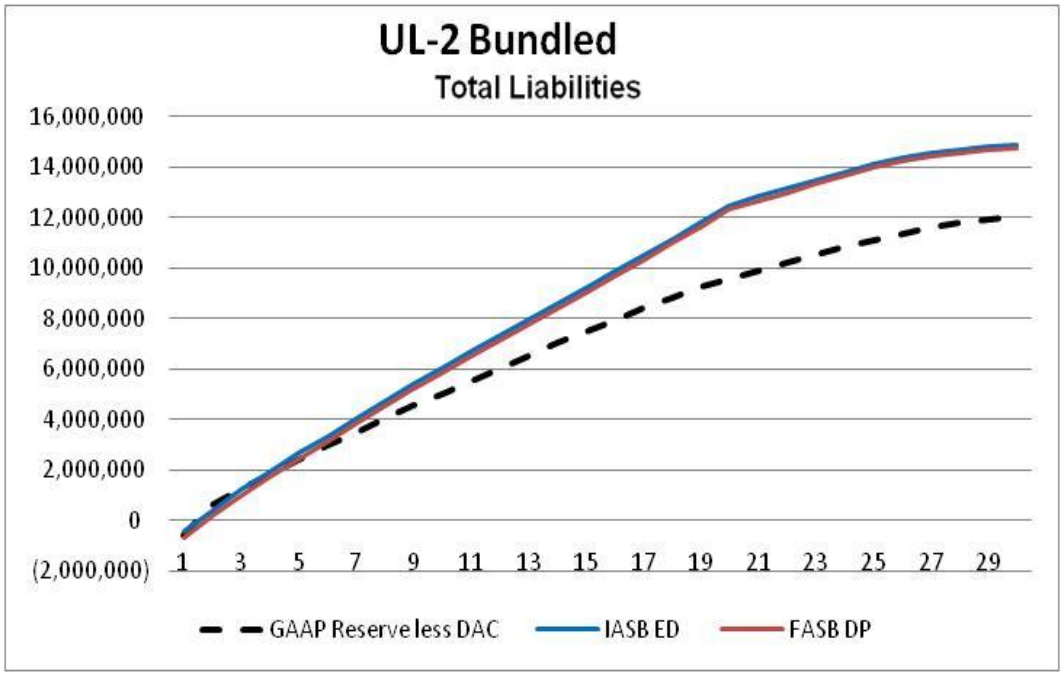


3.2.7 Liabilities for U.S. GAAP and baseline IFRS -- UL-2

Figure 3.2-12 provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP variation. In this case, the IASB ED and FASB DP variations are quite similar, as there is no residual or composite margin -- thus, the only difference is the risk adjustment.

Figure 3.2-12.

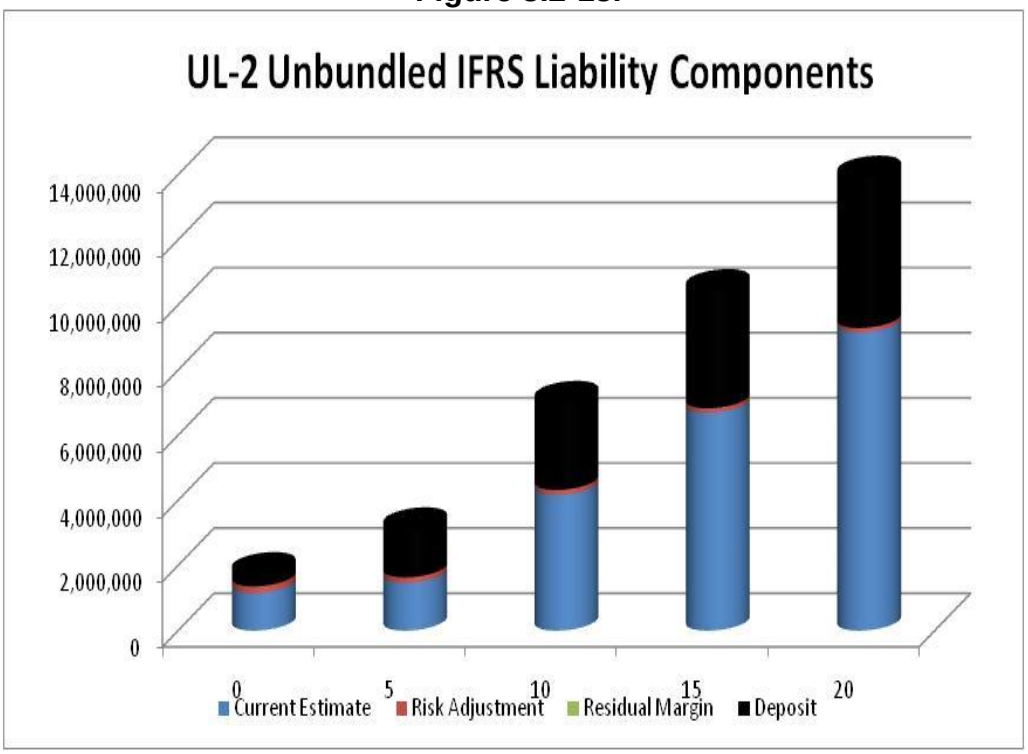


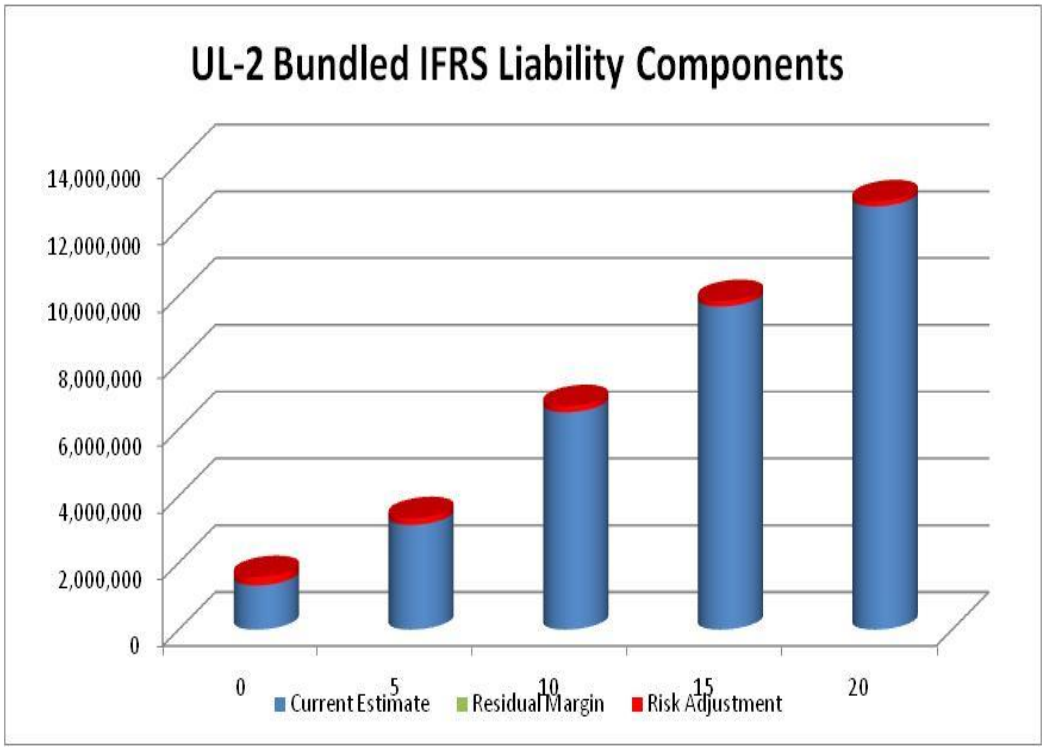


3.2.8 IFRS Liability Components -- UL-2

Components of the ED liability at selected durations are shown in Figure 3.2-13 in order to assist in understanding the magnitude of its components. The residual margin component is zero for this product, as the residual margin cannot be negative.

Figure 3.2-13.



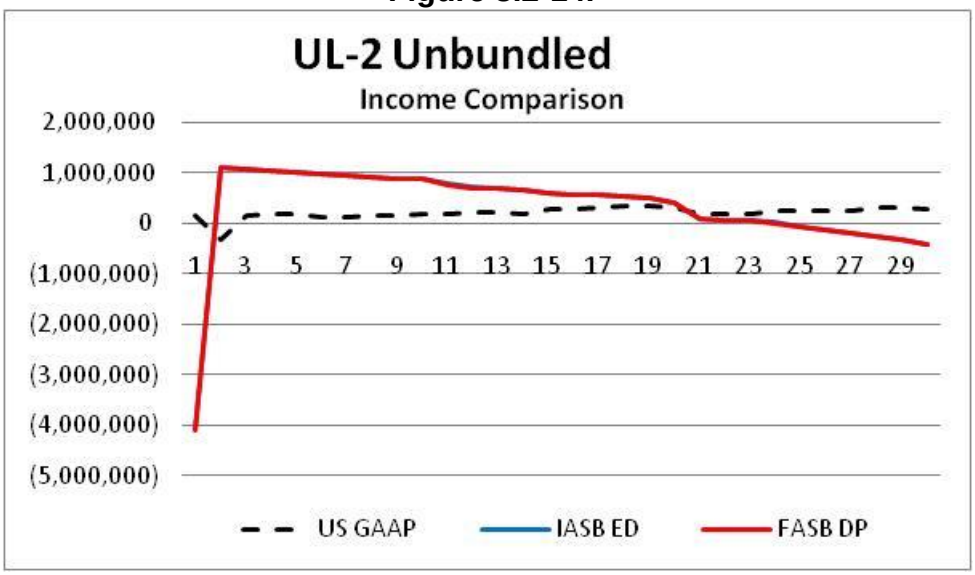


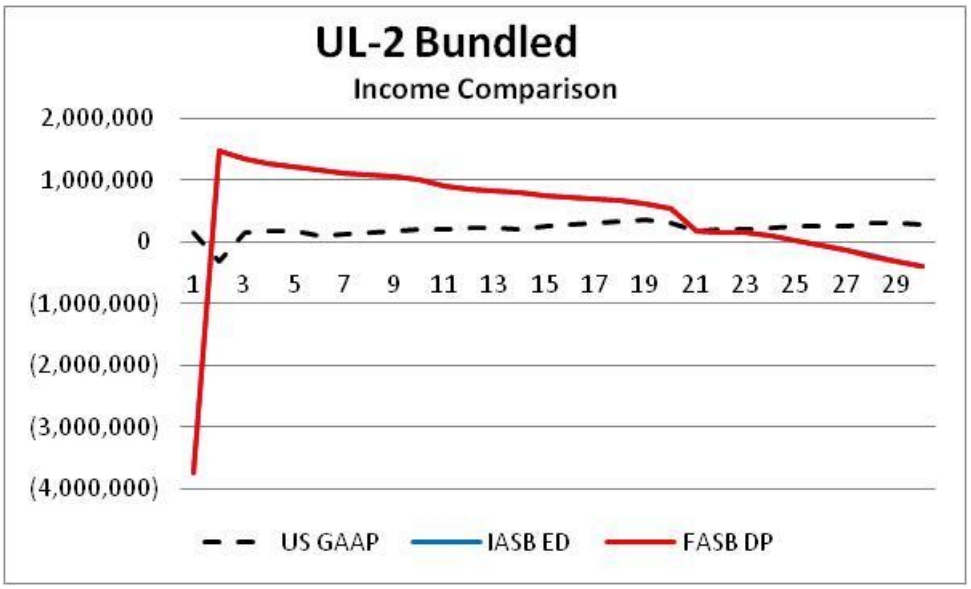
3.2.9 Income Statement Comparison -- UL-2

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.2-14. As indicated above, the difference in the income between the ED and the DP is the change in the risk adjustment, as there are no residual

or composite margins. This in turn causes the ED and DP results to be almost identical in the following charts. The loss at issue under IFRS creates most of the income difference from GAAP.

Figure 3.2-14.



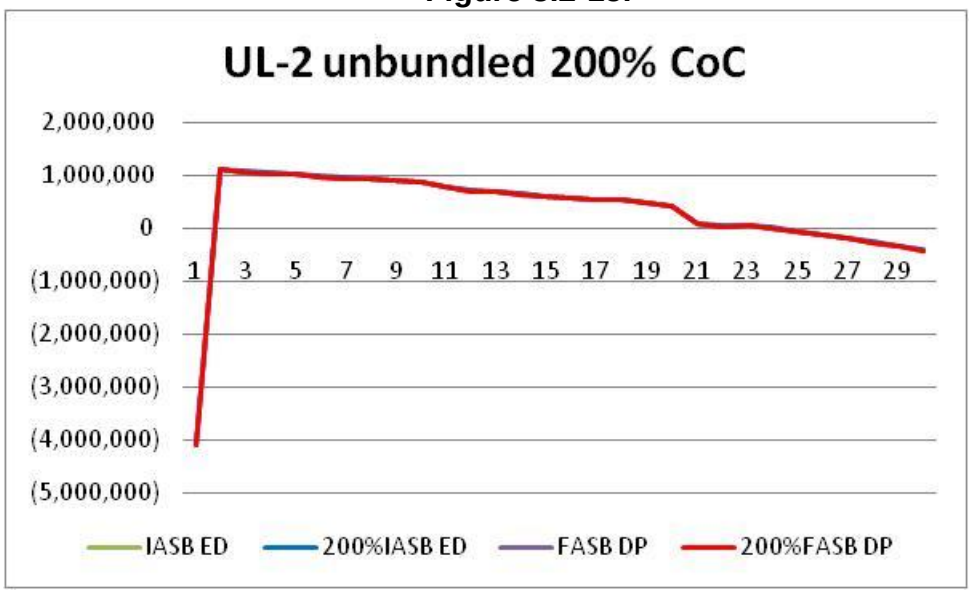


3.2.10 Sensitivities -- UL-2

Three sensitivities are shown in this section to illustrate the effect of: (1) a doubling in the cost of capital risk adjustment, (2) a change in the discount rates, (3) a one-time change of 150 basis points in the discount rates not offset by a simultaneous change in the investment income and (3) a one-time change of 200 basis points in the discount rates.

Figure 3.2-15 shows the sensitivity of income to a doubling of the capital factor used in the cost of capital method of risk adjustment. Since the risk adjustment for UL-2 is relatively small, the effect of this difference on income is also relatively small. This in turn causes the ED and DP results to be almost identical in the following charts.

Figure 3.2-15.



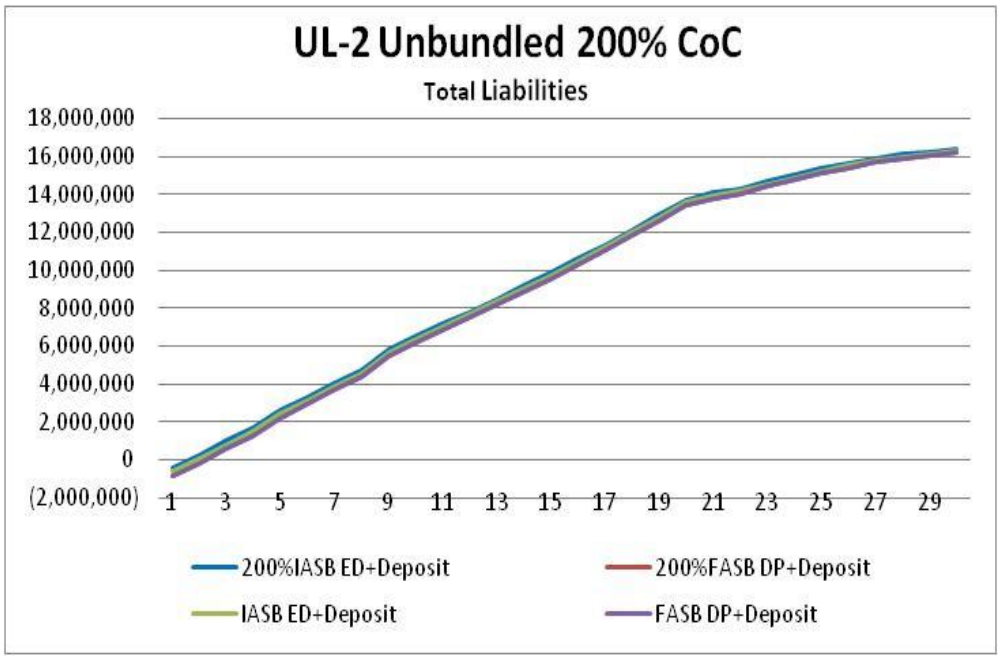


Figure 3.2-16 shows the effect on income of a one-time change in discount rates of 200 basis points (not offset by an increase in investment earnings) at the end of year 3 if a change in this risk was reflected in the discount rates.

Figure 3.2-16.

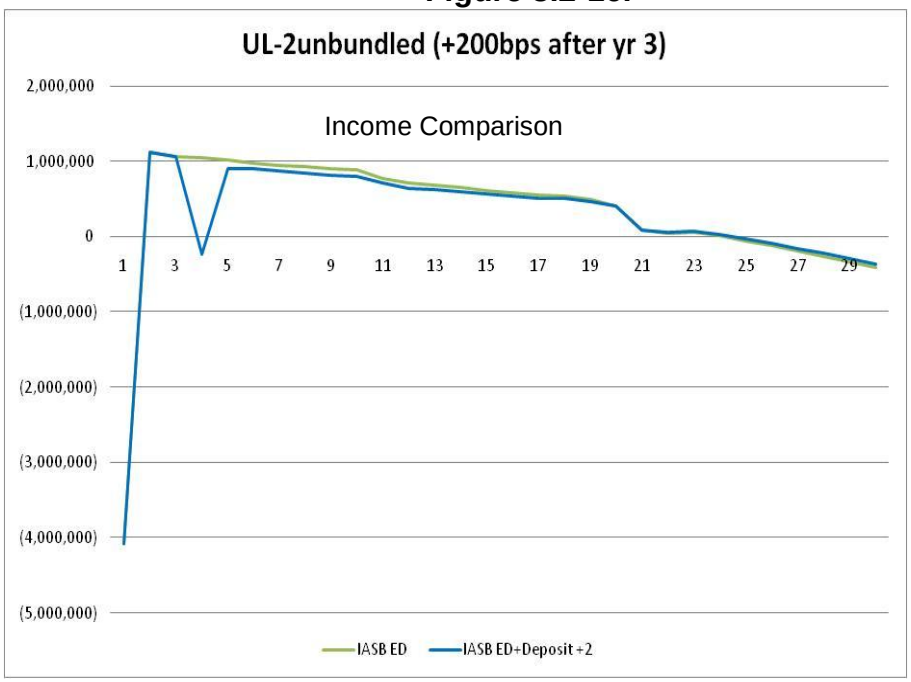
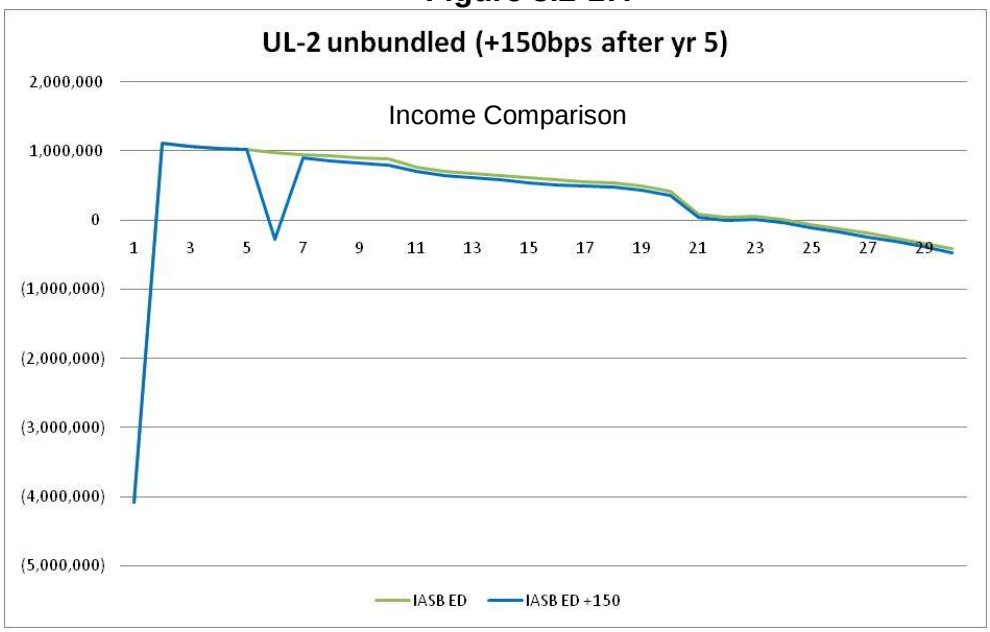


Figure 3.2-17 shows the effect on income of a one-time change in discount rate of 150 basis points (along with an increase in investment earnings) at the end of year 5 that could be caused by an increase in the underlying yield curves at that time,

Figure 3.2-17.

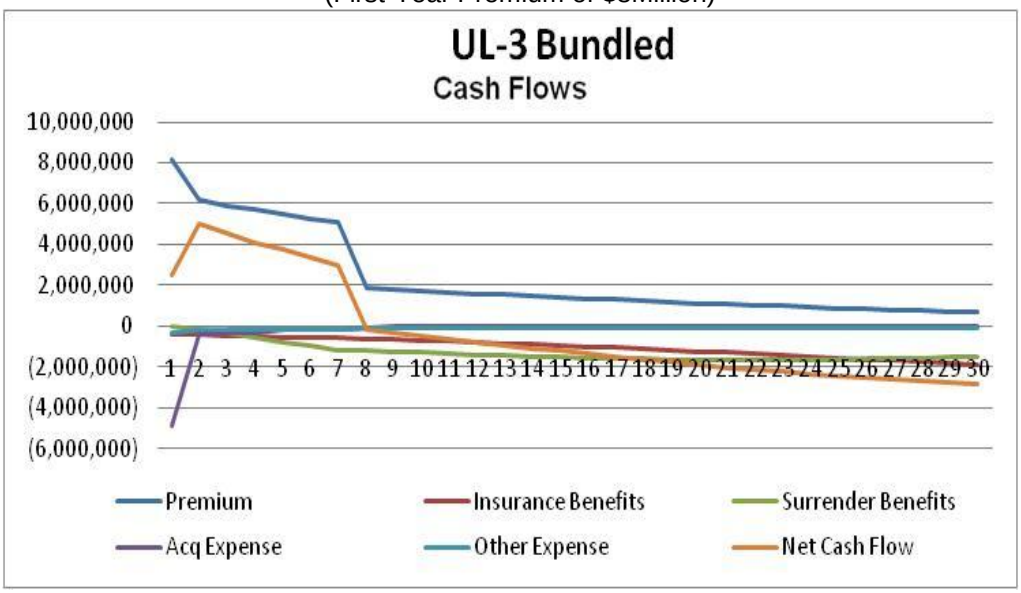


3.2.11 Cash Flow Components -- UL-3

Fundamental to the measurement of the liability of these universal life insurance contracts as shown in Figure 3.2-21 are cash flow components for the bundled version. The expected incidence and amounts of the major elements of expected cash flows are shown, as well as the total ED income. The bundled Figure includes premium and

investment income in the first item. The figures reflect the single and seven pay nature of many of the contracts included here.

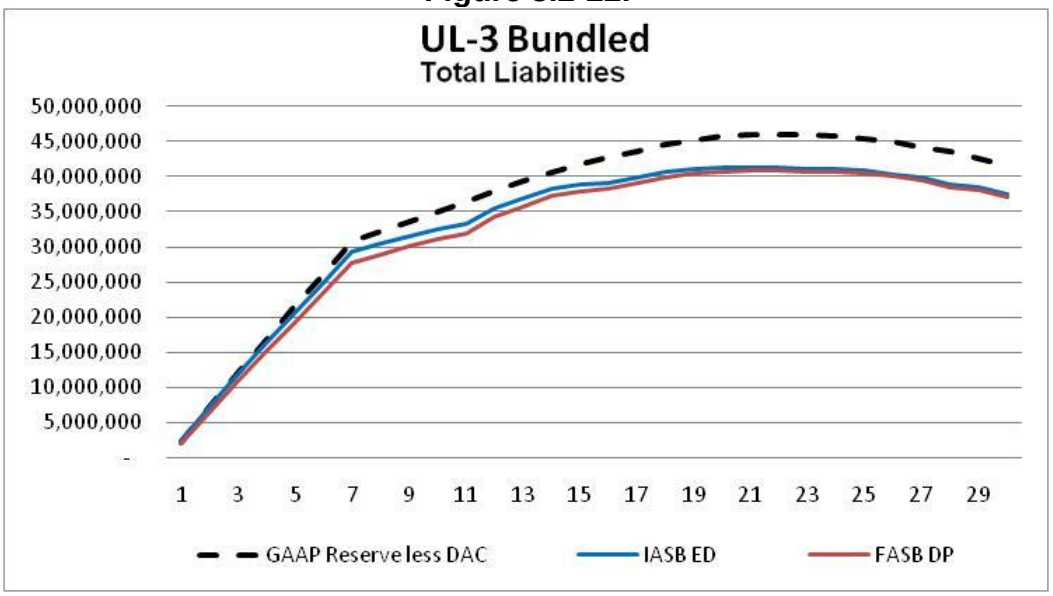
Figure 3.2-21.
(First-Year Premium of $8Million)



3.2.12 Liabilities for U.S. GAAP and baseline IFRS -- UL-3

Figure 3.2-22 provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP on a bundled basis. The liability based on the IASB DP is greater than the FASB DP liability because of the differential effect of the runoff of the residual and composite margin.

Figure 3.2-22.

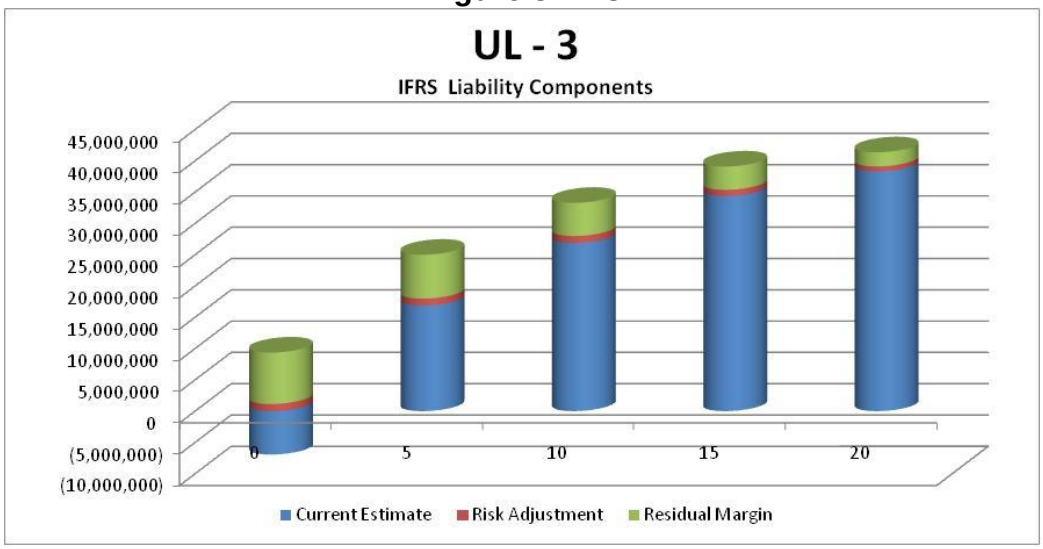


3.2.13 IFRS Liability Components -- UL-3

Components of the ED liability are shown in Figure 3.2-23 to assist in understanding the magnitude of the components in the liability. The risk adjustment

component is minor relative to the residual margin for this product, and under the convention using the cost of capital for risk adjustment.

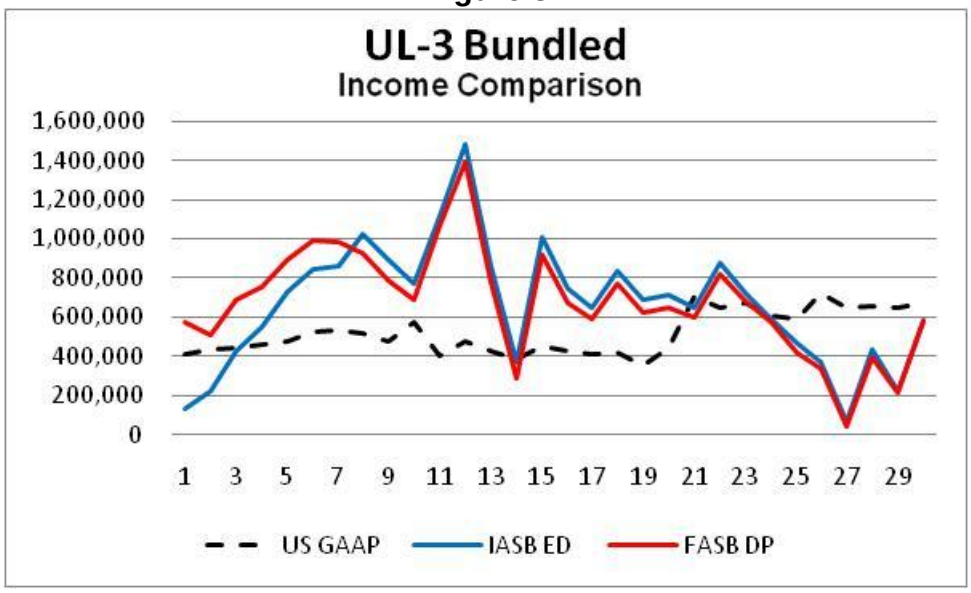
Figure 3.2-23.



3.2.14 Income Statement Comparison -- UL-3

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.2-24. In year 12 there was a large increase in investment income that accounts for the spike that appears in the IFRS results. As the investment income is meant to net with the interest on CE the increase in return without a corresponding increase in liability creates additional income in the period.

Figure 3.2-24.



3.3 Participating Whole Life Insurance

These participating (par) contracts are whole life insurance contracts. They were or are anticipated to be sold to individuals. Their policyholder dividends are based on the contribution principle (dividends payable to policyholders consistent with their contributions to built-up surplus). No dividends or shares to stockholders are reflected (e.g., no 90/10 split between policyholders and shareholders were applicable). The expected dividends are based on expected investment earnings, and not on earnings consistent with the risk-free rates, and have not been varied with alternative discount rates. The values include the effect of insurance purchased by the policyholder dividends as single premium paid up additions, thus adding to later contract duration values.

For U.S. GAAP, balance sheets, deferred acquisition expenses, and income statements were developed based on FAS 120, with liabilities equal to the regulatory liability and a deferred acquisition cost asset. The projections were based on best estimate assumptions, such as rates of mortality and lapse. Since it was assumed that the products were issued on a profitable basis and that no adverse change in expectations occurred, the projections assume that no recoverability issues arise and that no premium deficiency reserve is needed.

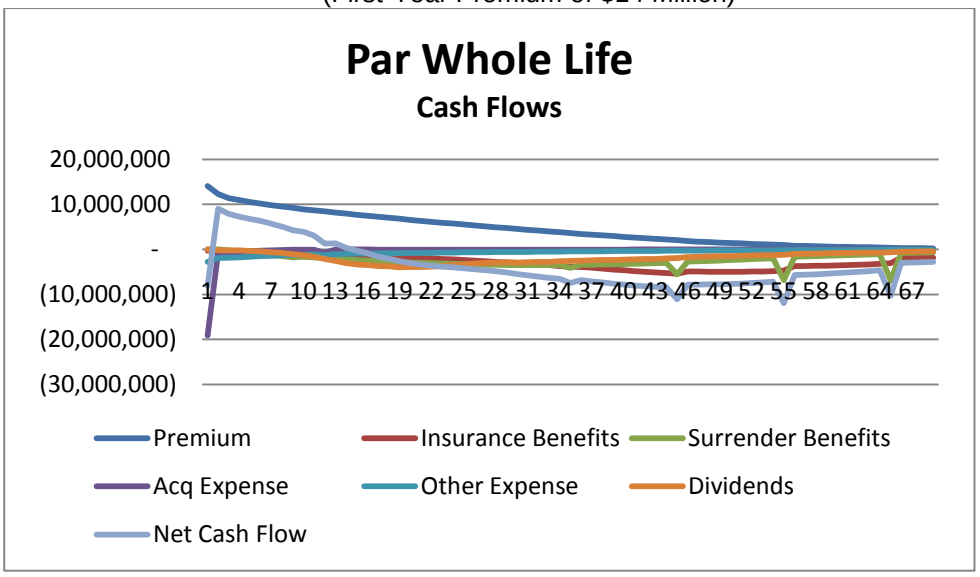
The cash flows underlying the IFRS results were based on the U.S. GAAP cash flow projections: that is, the probabilistic weighted average cash flows required for IFRS were assumed to be equal to the best estimate scenario used to produce GAAP results. The baseline IFRS liability is based on the present value of cash flows. A case could be made that there is limited need for a risk adjustment for these contracts due to the existence of fairly substantial policyholder dividends that could be available to offset any but the extreme conditions. The residual margin stays large for so long due to the accretion of interest being greater than early contract years' benefits.

Par Whole Life	Time 0	End of Year 1
Current estimate	- 277,000,662	- 330,123,140
Risk adjustment	34,672,164	34,470,007
Residual margin	242,328,498	253,493,124
Composite margin	277,000,662	272,211,356
Liability -- IASB ED	0	42,160,008
Liability -- FASB DP	0	57,911,784
Non-incremental acquisition cost	1,953,687	
Incremental-to-the-contract acquisition cost	17,177,595	

3.3.1 Cash Flow Components

Components of the measurement of the liability of the par life insurance contracts are shown in Figure 3.3-1 that shows the expected incidence and amount of the major elements of expected cash flows. These are insurance cash flows and exclude the investment income from the assets backing the insurance liabilities. The liability spikes in years 45, 55 and 65 of the projection occur at the end of the projection period at the older issue age model cells, causing higher apparent decreases in cash flows as a result of the assumed termination of the contracts at that time under both the FASB DP and IASB ED. These contracts are expected to achieve very good persistency. The large values in later contract years are due to the use of policyholder dividends to purchase paid up additional amounts of insurance.

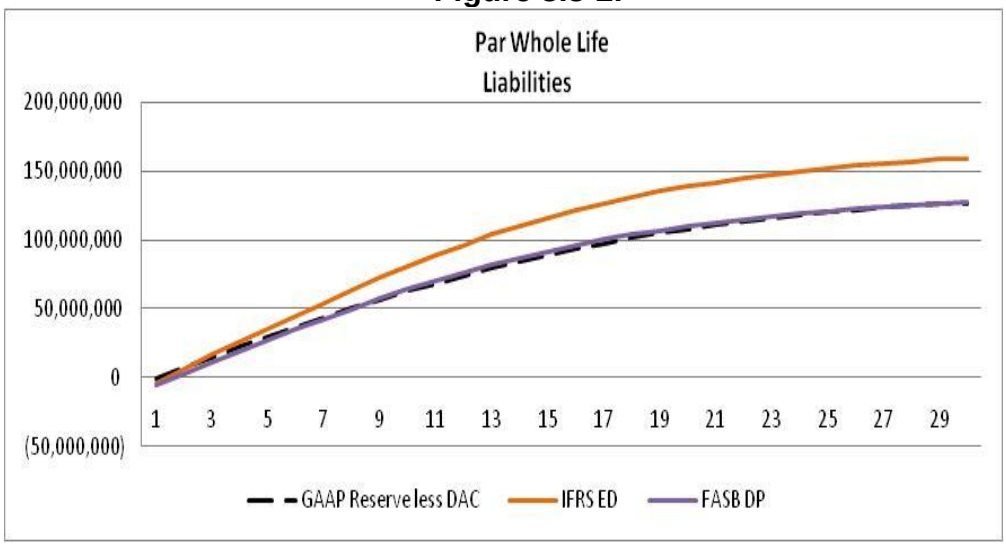
Figure 3.3-1.
(First-Year Premium of $14 Million)



3.3.2 Liabilities for U.S. GAAP and baseline IFRS

Figure 3.3-2 provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP. The DP liabilities are less than the ED liabilities primarily due to the differential in the release of their margins, with the composite margin not accreting interest over the long period which it is in effect.

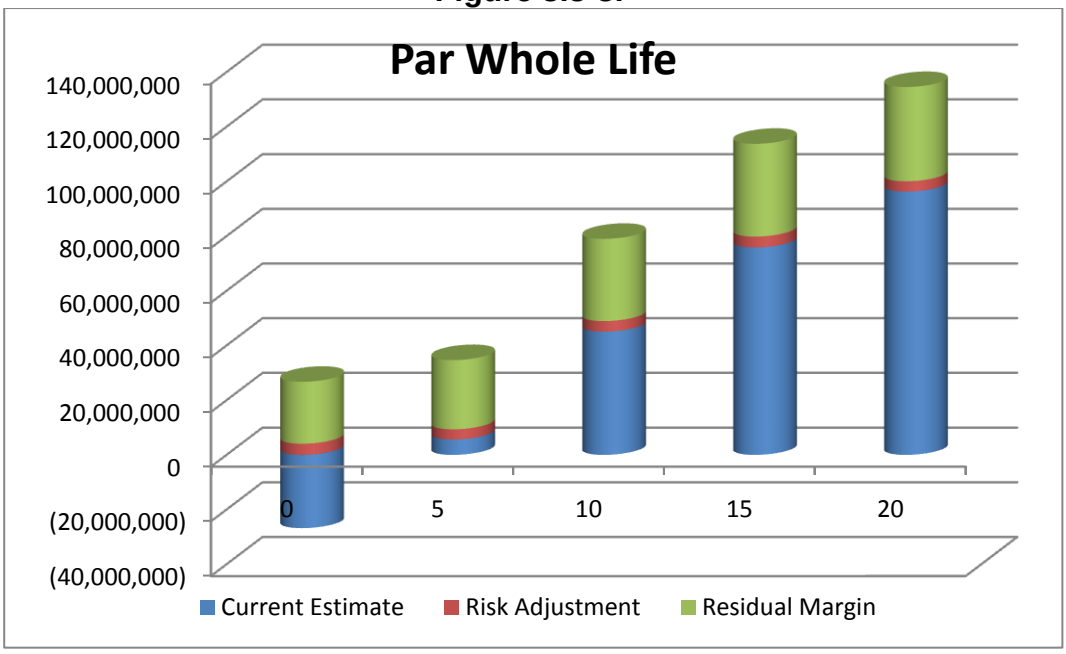
Figure 3.3-2.



3.3.3 IFRS Liability Components

Components of the ED liability at selected durations are shown in Figure 3.3-3 to assist in understanding the magnitude of the components in the liability. The risk adjustment component is minor relative to the residual margin for this product, and is determined under the convention using the cost of capital for risk adjustment used in this study. The residual margin grows through accretion of interest being greater than its amortization for many years.

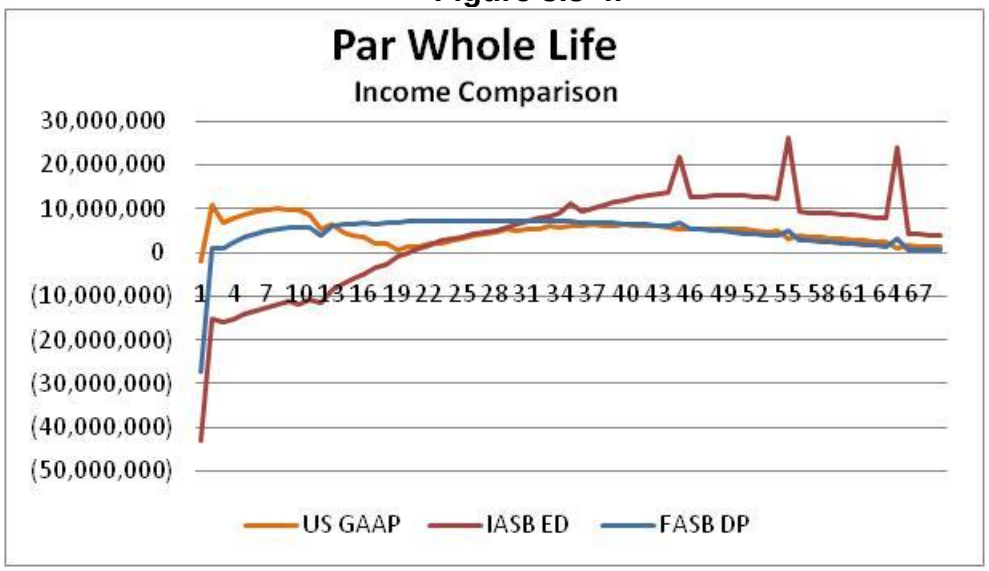
Figure 3.3-3.



3.3.4 Income Statement Comparison

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.3-4. The IASB ED income remains lower than the FASB DP income due to the accretion of interest in residual margin in the earlier years exceeding the amortization. In the later years this is released leading to higher income. The income spikes in years 45, 55 and 65 of the projection at the end of the projection period for older issue age model cells, occur as those contracts are assumed to terminate (with excellent persistency and paid-up additional values purchased through policyholder dividends), causing higher apparent amortization under both the FASB DP and IASB ED.

Figure 3.3-4.



3.3.5 Sensitivities

Figure 3.3-5 shows the difference in income due to the use of the expected earned rate compared to the base case discount rate (risk-free plus a liquidity premium). Use of the underlying earnings rate leads to larger early accretion of the residual margin balance, and thus to lower income than using the risk-free discount rate would. The higher income in years 15-30 results from the different accretion of discount rates applied to the residual margin balance during a period in which that balance is beginning to be amortized at a faster rate under the risk-free plus liquidity premium method, while under the earned rate method the balance is still growing. After year 30, when the earnings rate is less than the discount rate, the change in the residual margin begins to release more into income.

Figure 3.3-5.

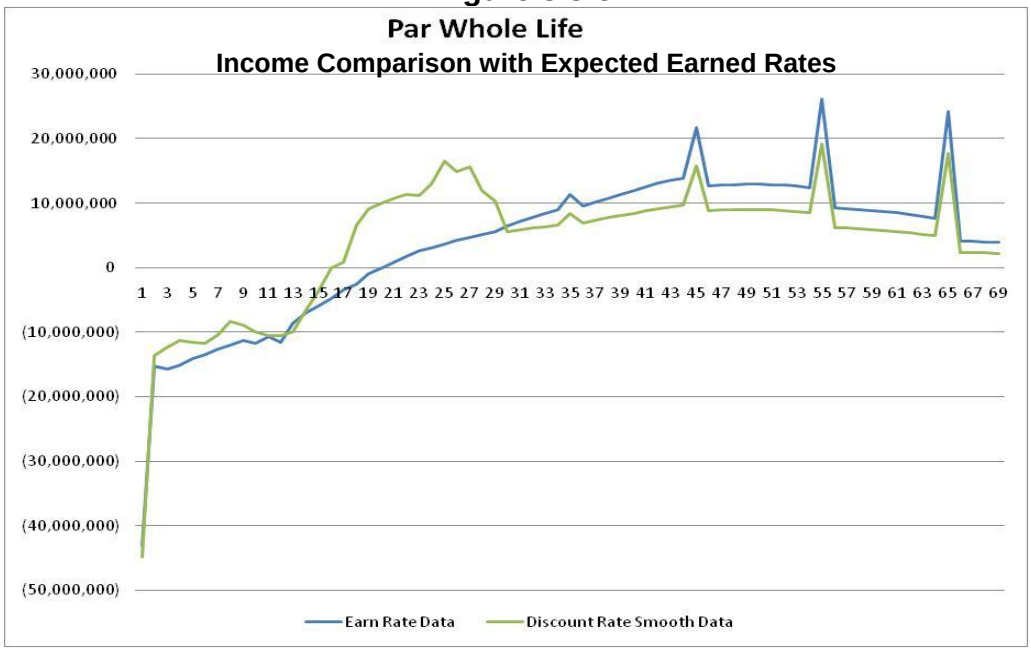


Figure 3.3-6 shows the sensitivity of income to using the underlying IFRS liability as the basis for the investment income in place of the US GAAP net liability (see Appendix 7.3 for further discussion of this). Use of the IFRS liability as a base for reported investment income leads to higher income than using the US GAAP net liability for this set of circumstances. After that adjustment, the IASB DP method still has initial earnings lower than the FASB DP method due to the accretion of interest.

Figure 3.3-6.

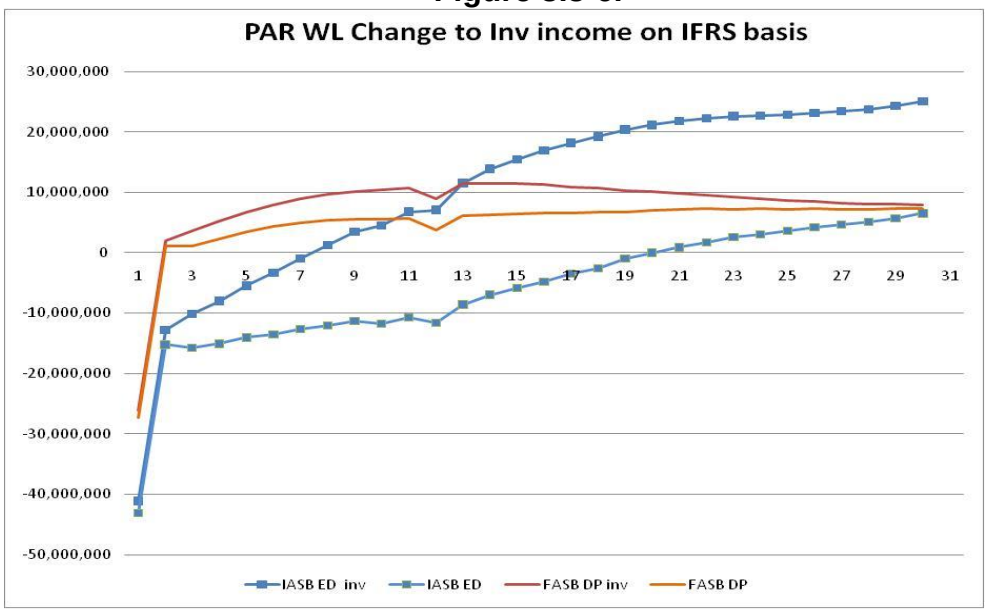
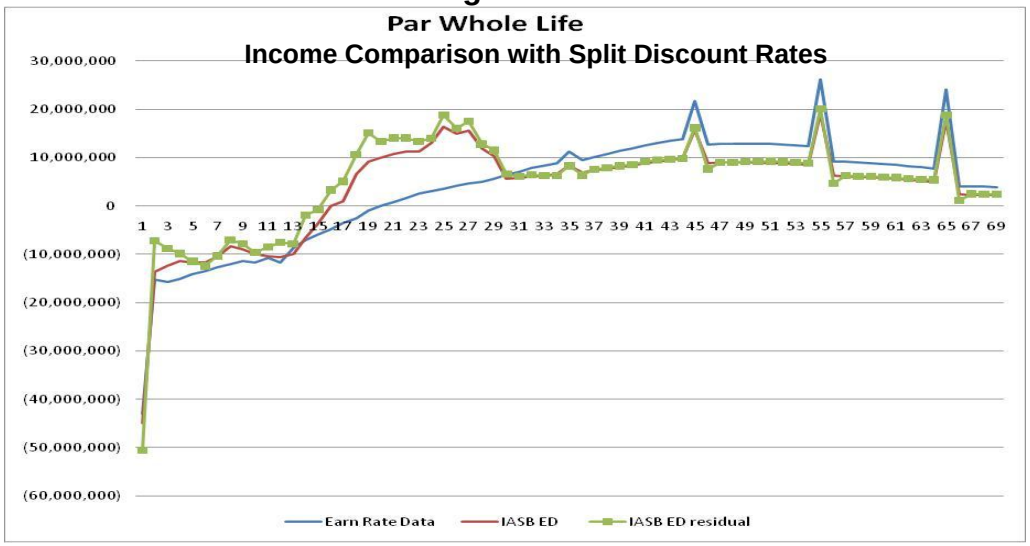


Figure 3.3-7 shows the sensitivity of income to the use of a split discount rate in the determination of the initial current estimate and the amortization of the residual margin. In this calculation the policyholder dividends were discounted using the expected earned rate and the other policy flows were discounted using the risk-free rate plus liquidity premium. This approach illustrates another potential interpretation of the IASB methodology and is not meant to be suggested as the appropriate approach to use. The results show a larger initial loss than the pure earned rate or pure risk-adjusted plus liquidity premium discount rate calculations, and then show a different release pattern, as would be expected.

Figure 3.3-7.



3.4 Single Premium Immediate Annuities

These are income payout annuities sold to individuals with no certain periods (i.e., they are life contingent only), for example, a level monthly benefit is paid and is guaranteed for life to the extent the annuitant (or joint annuitant) survives. Underlying assets are commingled with the insurer's general account assets. The periodic amount of

income payout is guaranteed. They don't have a cash value or an explicit account balance.

For U.S. GAAP, balance sheets and income statements were developed based on a FAS 97 limited-payment basis, with liabilities determined on the basis of FAS 60 long duration contracts and a deferred revenue liability, as well as a deferred acquisition cost asset. The projections were based on best estimate assumptions, such as rates of mortality and lapse. Since it was assumed that the products were issued on a profitable basis and that no adverse change in expectations occurred, the projections assume that no recoverability issues arise and that no premium deficiency reserve is needed.

The cash flows underlying the IFRS results were based on the U.S. GAAP cash flow projections: that is, the probabilistic weighted average cash flows required for IFRS were assumed to be equal to the best estimate scenario used to produce GAAP results. The baseline IFRS liability is based on the present value of cash flows.

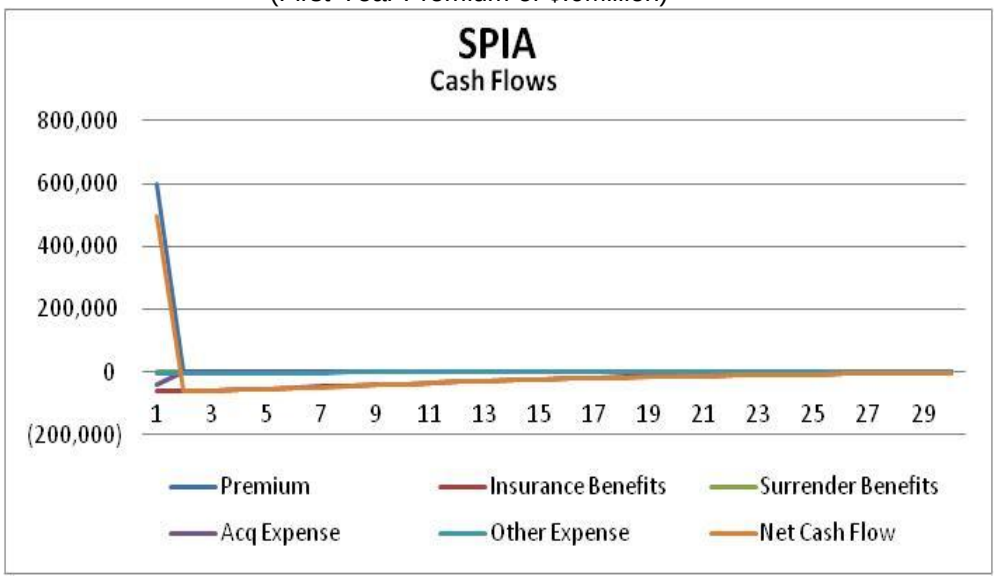
Single Premium Immediate Annuity	Time 0	End of Year 1
Current estimate	- 25,077	500,599
Risk adjustment	4,708	4,074
Residual margin	20,299	18,273
Composite margin	25,007	23,008
Liability -- IASB ED	0	522,946
Liability -- FASB DP	0	523,607
Non-incremental acquisition cost	22,605	
Incremental-to-the-contract acquisition cost	19,000	

3.4.1 Cash Flow Components

The components of the measurement of the liability of the SPIA contracts are shown in Figure 3.4-1 that shows the expected incidence and amount of the major elements of expected cash flows.

Figure 3.4-1.

(First-Year Premium of $.6Million)

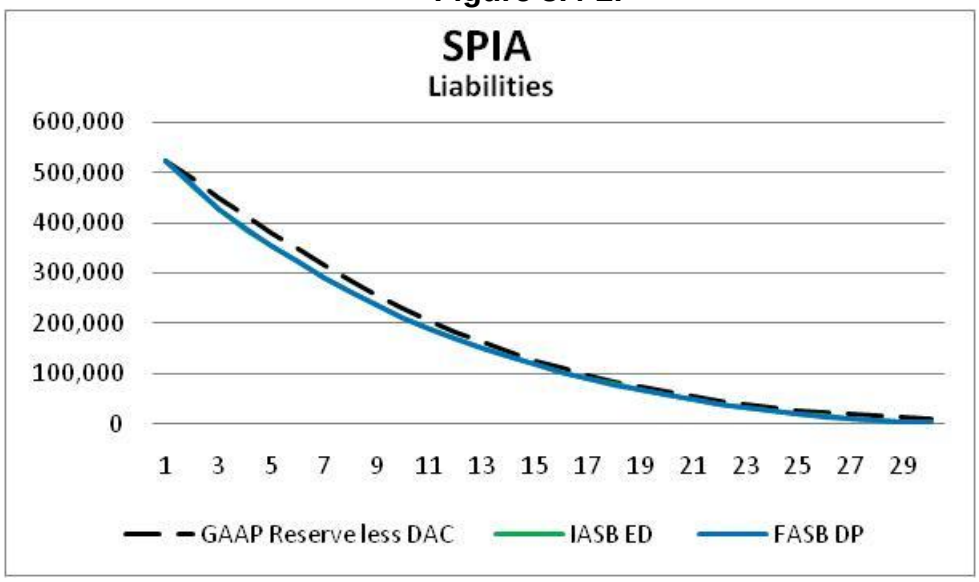


3.4.2 Liabilities for U.S. GAAP and baseline IFRS

Figure 3.4-2 provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP. The small amount of risk adjustment, relative to the overall liability, causes the IASB ED results and the FASB DP results to be almost

identical. The difference between the ED and DP compared with the U.S. GAAP liability is primarily due to the subsequent measurement of the residual margin and the unearned profit reserve release unde U.S. GAAP.

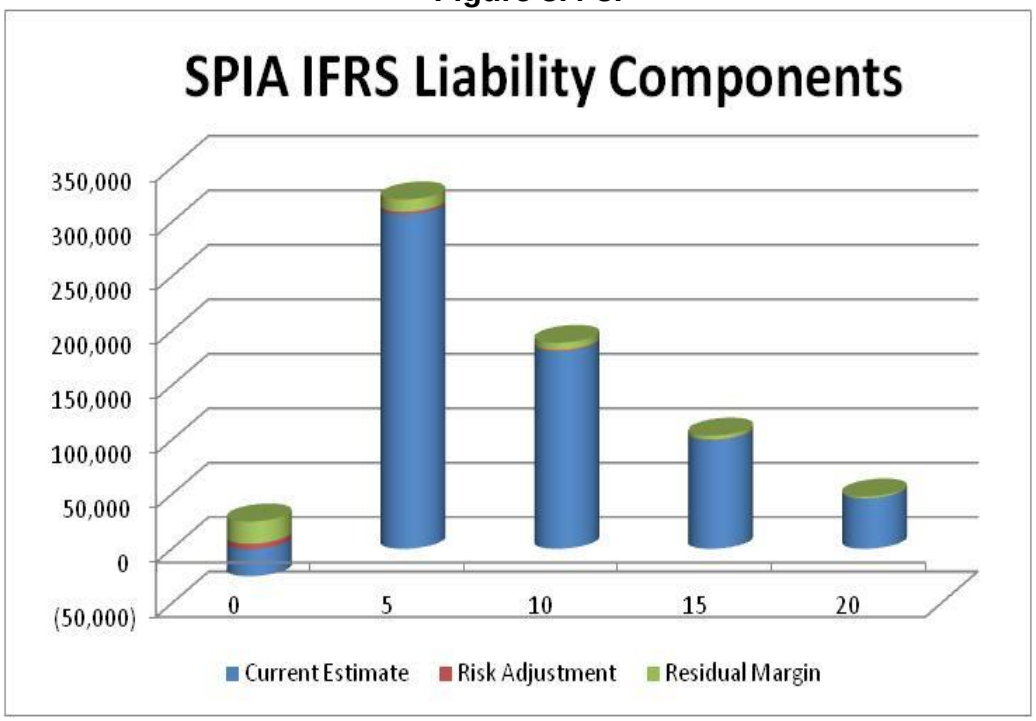
Figure 3.4-2.



3.4.3 IFRS Liability Components

Components of the ED liability are shown in Figure 3.4-3 to assist in understanding the magnitude of the components in the liability. The residual margin is relatively minor for this product. The risk adjustment is determined under the convention using the cost of capital for risk adjustment used in this study. Note that, as shown in Section 3.4.5, if no liquidity premium would have been included, this product would have no residual margin. The risk adjustment is so small in this case, because of the choice of surrogate cost of capital factors -- a major factor is applied to premiums, which in this case provides no adjustment for risk after issue due to its single premium nature. This points out the importance of a proper choice of a risk adjustment surrogate, if using an approximation.

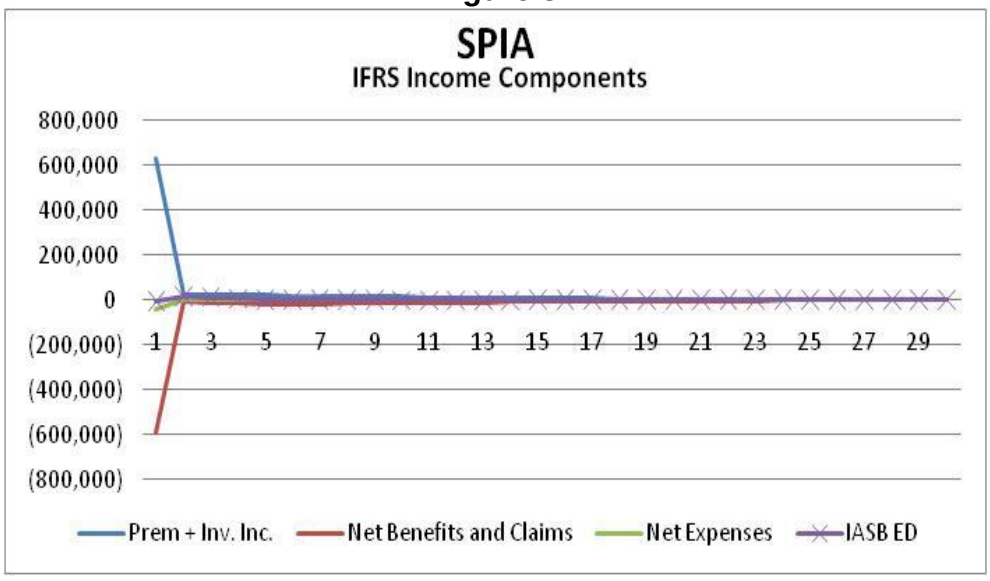
Figure 3.4-3.



3.4.4 Income Components

Components of the IASB DP income are shown in Figure 3.4-4.

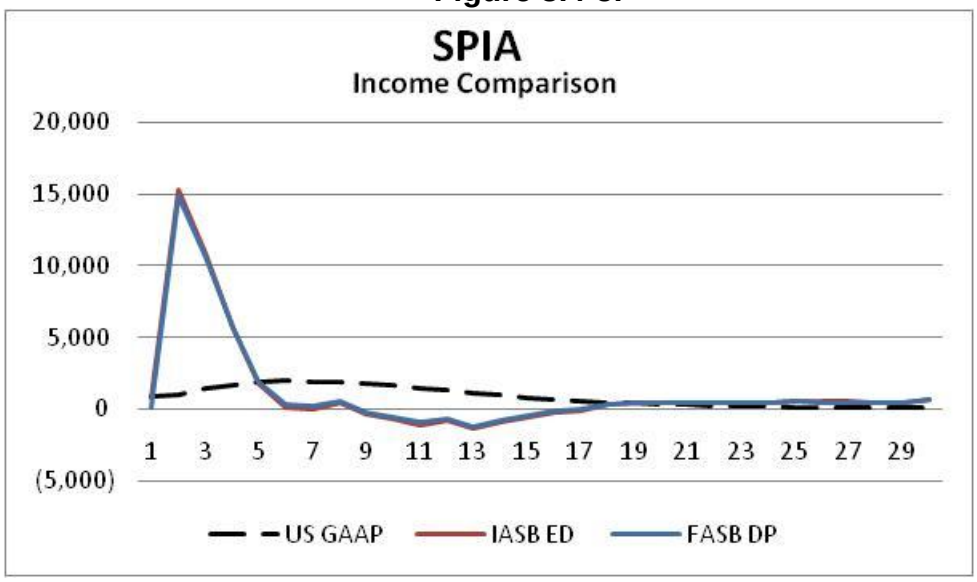
Figure 3.4-4.



3.4.5 Income Statement Comparison

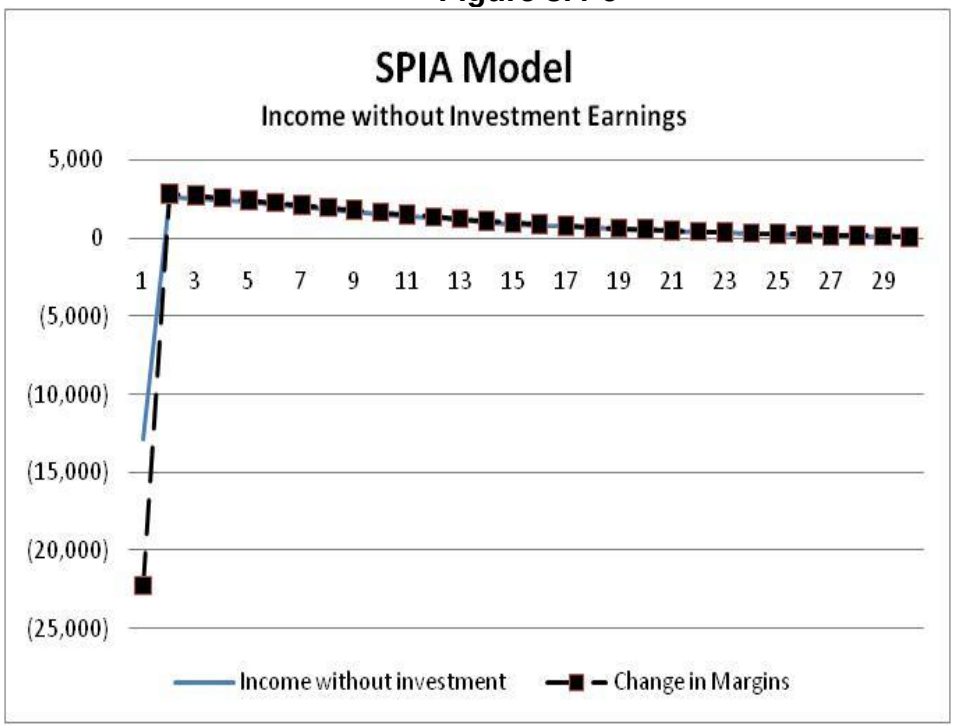
A comparison of the emergence of earnings under U.S. GAAP, the ED and the DP is shown in Figure 3.4-5. The ED and DP results are indistinguishable due to the small relative size difference in the amortization. As discussed later, the large increase in year two is related to the investment income component.

Figure 3.4-5.



Besides the initial non incremental acquisition expense in year 1, the use of investment income based on the net US GAAP liability causes the ED results to appear more profitable in the early contract years. By removing the effect of investment income we arrive at income results that appear to be in more in line with the release of margins, which is what would be expected. Figure 3.4-6 below demonstrates this.

Figure 3.4-6

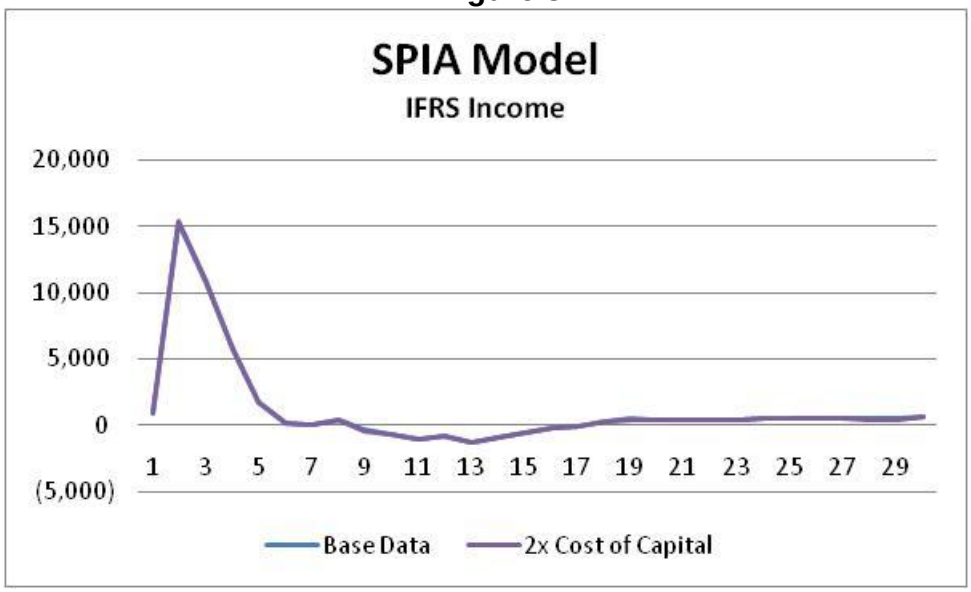


3.4.6 Sensitivities

Sensitivities in the section were run to illustrate the effect of (1) doubling the cost of capital risk adjustment factors, (2) changing the discount rate yield curve by plus or minus 100 basis points, and (3) removal of the liquidity premium in the discount rate calculation.

Figure 3.4-7 shows the sensitivity of income to a doubling of the economic factor used in the cost of capital risk adjustment method used in this study. As the risk adjustment is small relative to other liability, there is not a discernable effect on income by the doubling of the risk adjustment.

Figure 3.4-7



Figures 3.4-8 and 9 show the sensitivity of income to a shift in the yield curve by +/- 100 basis points. The impact of the discount rate reduction is limited in the first year due to the low initial risk-free rate. As might be expected with a relatively large residual margin in year 1 of the base case, there are increases in future years as the margin is released. And when the residual margin is decreased, a gain in year 1 results followed by lower income after that.

Figure 3.4-8.

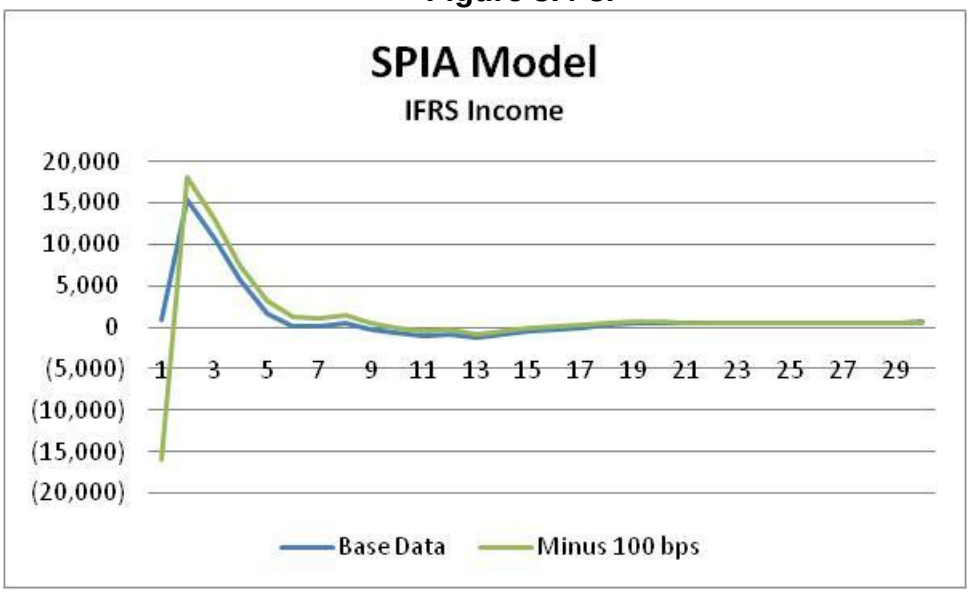
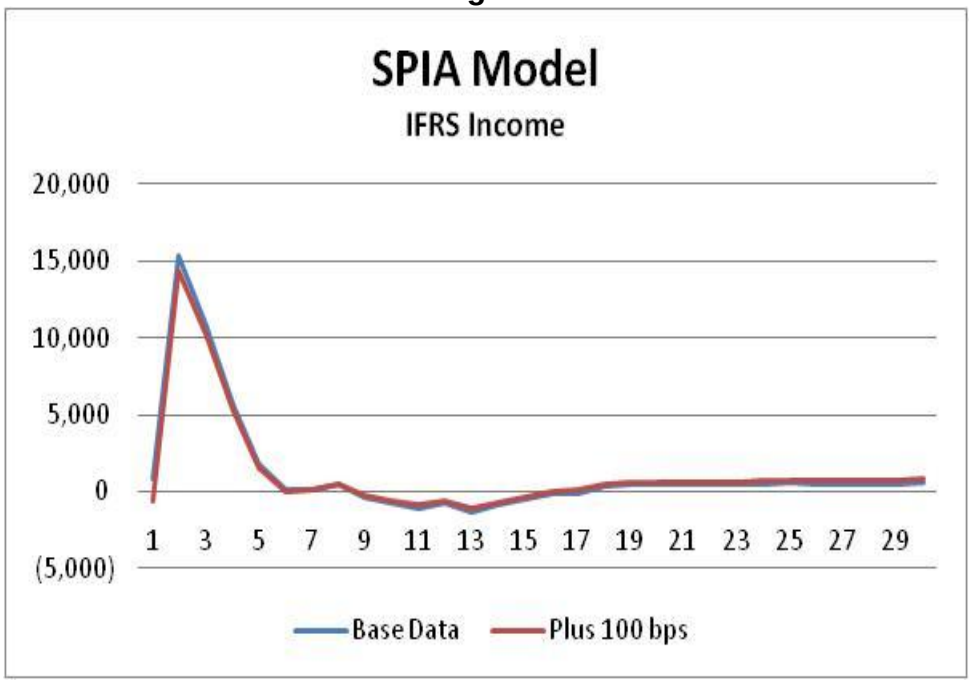
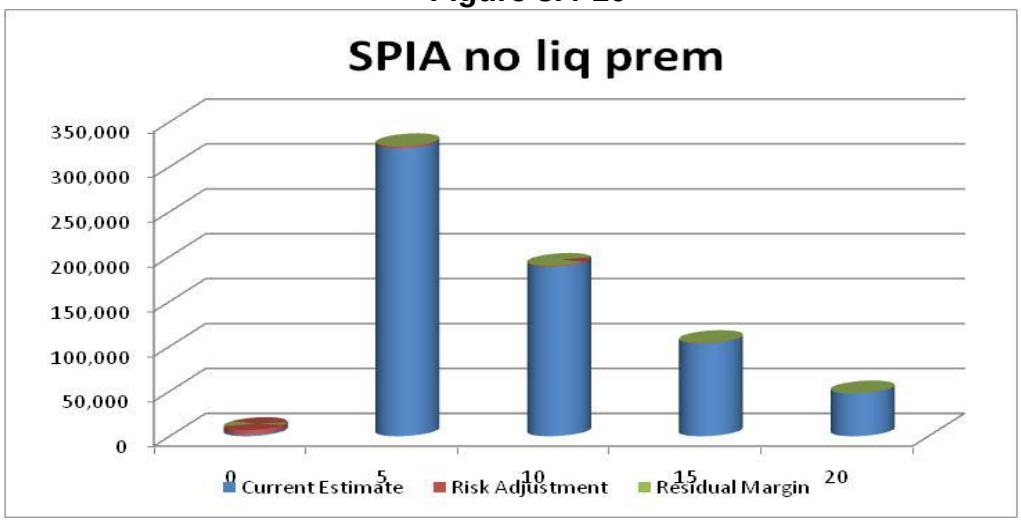


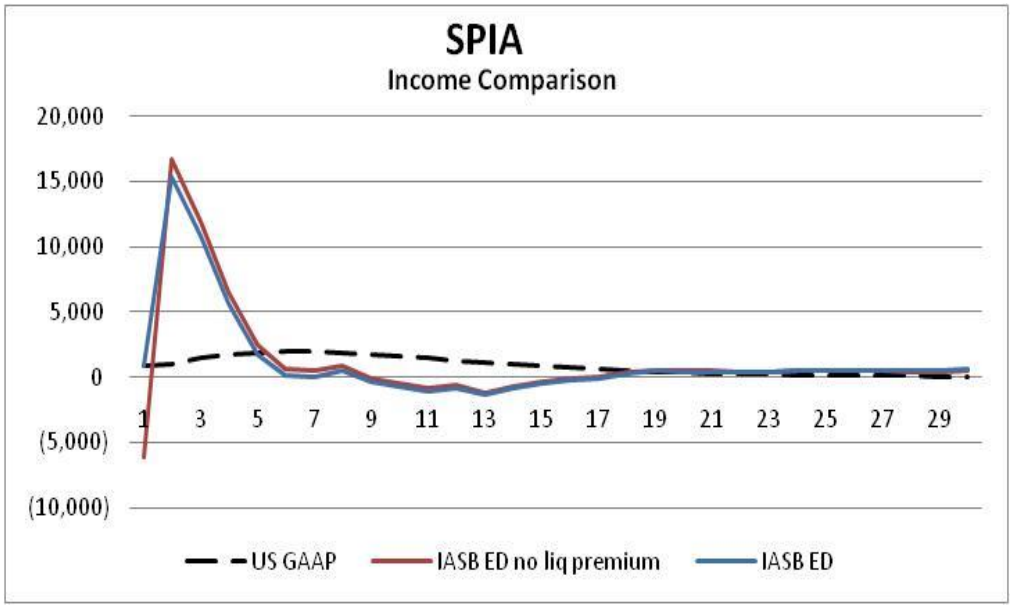
Figure 3.4-9



Figures 3.4-10 show the sensitivity of income to a shift in the discount rate by removing the liquidity premium adjustment. As might be expected, with a lower discount rate no residual margin is established in year 1. The sensitivity to the liquidity premium adjustment can be seen by comparing Figure 3.4-10 and Figure 3.4-3.

Figure 3.4-10





3.5 Variable Deferred Annuities

These are single-premium contracts sold to individuals. They have a cash value during the accumulation period that depends upon asset performance of a designated set of assets, with an explicit account balance (a surrender charge during the first 7 contract years). The underlying assets are invested in various separate accounts (whose assets are invested in various types of financial instruments, e.g., common stocks) and are all marked-to-market, also with a fixed general account fund. Although various minimum guarantees are often provided in variable annuities, the only one included in the contract modeled are guaranteed minimum death benefits (GMDBs).

For U.S. GAAP, balance sheets and income statements were developed based on FAS 97, with liabilities equal to the account value and SOP 03-1; and a deferred acquisition cost asset. The projections were based on best estimate assumptions, such as rates of mortality and lapse, and stochastic rates of return. Since it was assumed that the products were issued on a profitable basis and that no adverse change in

expectations occurred, the projections assume that no recoverability issues arise and that no premium deficiency reserve is needed.

The cash flows underlying the IFRS results are based on the stochastic U.S. GAAP cash flow projections. The baseline IFRS liability is based on the present value of cash flows. Investment income in the general account was assumed to be earned at a 6% rate. The separate account mean return assumption was about 8.25%, which was used to determine the base case discount rate. As a sensitivity, the discount rates used were the risk-free plus liquidity premium rates, as given in Appendix 7.1.

The ED liabilities are based on an unbundled liability approach. The income is the fees collected and the benefits paid are the benefits in excess of the account value released.

Variable Annuities (unbundled approach, with total liabilities included)

	Time 0	End of Year 1
Current estimate	31,902	32,344
Risk adjustment	397	422
Residual margin	0	0
Composite margin	0	0
Liability -- IASB ED	0	32,766
Liability -- FASB DP	0	32,344
Non-incremental acquisition cost	0	
Incremental-to-the-contract acquisition cost	1,500	

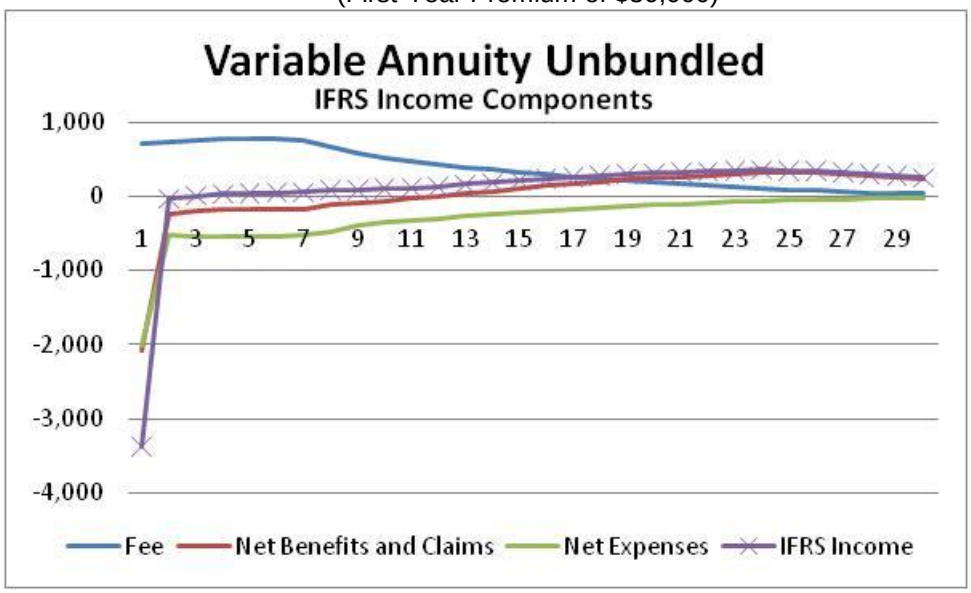
Variable Annuities (bundled approach)

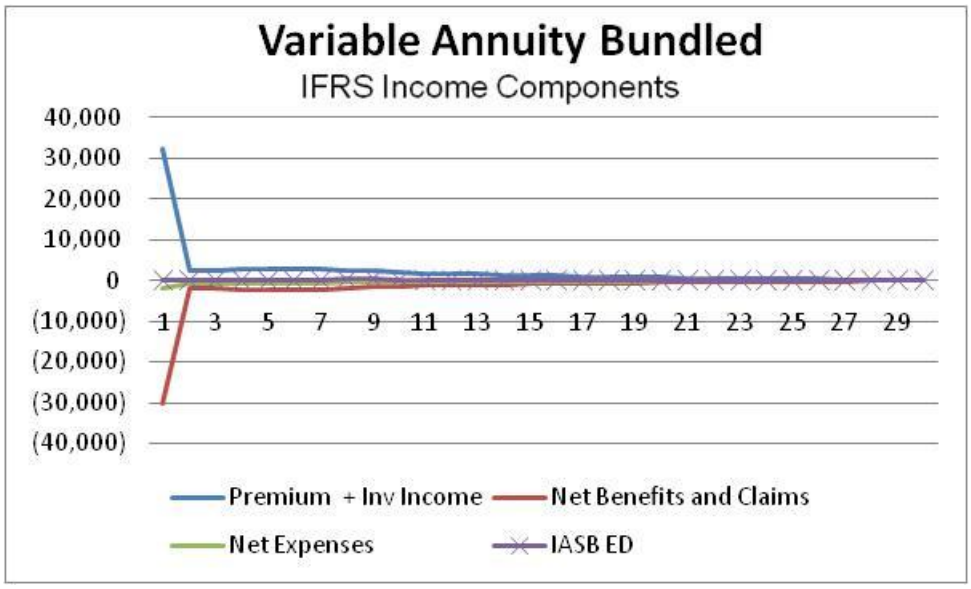
	Time 0	End of Year 1
Current estimate	- 5,897	23,940
Risk adjustment	2,421	2,587
Residual margin	3,477	3,328
Composite margin	5,897	5,646
Liability -- IASB ED	0	31,100
Liability -- FASB DP	0	30,566
Non-incremental acquisition cost	0	
Incremental-to-the-contract acquisition cost	1,500	

3.5.1 Flow Components

Estimates of the major insurance contract flows of the insurance component are shown in Figure 3.5-1. In an unbundled approach for the insurance component, instead of cash flows the flows shown below represent the net earned fees from the deposit component. It should be noted that for the Unbundled Figure the fee component represents fees and charges as described earlier and also includes net general account investment income(excess of earned over credited). The Bundled Figure includes premium and investment income in the first item.

Figure 3.5-1.
(First-Year Premium of $30,000)

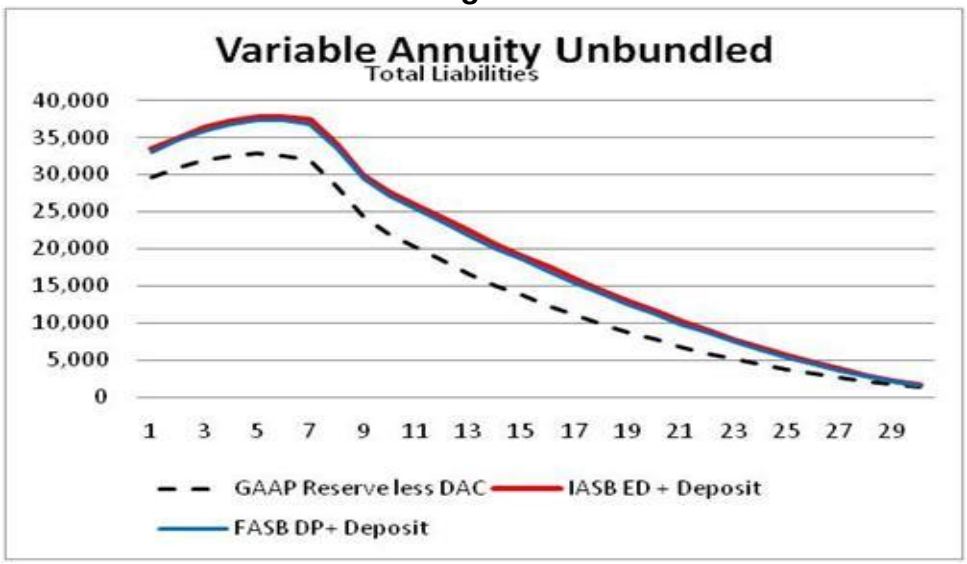


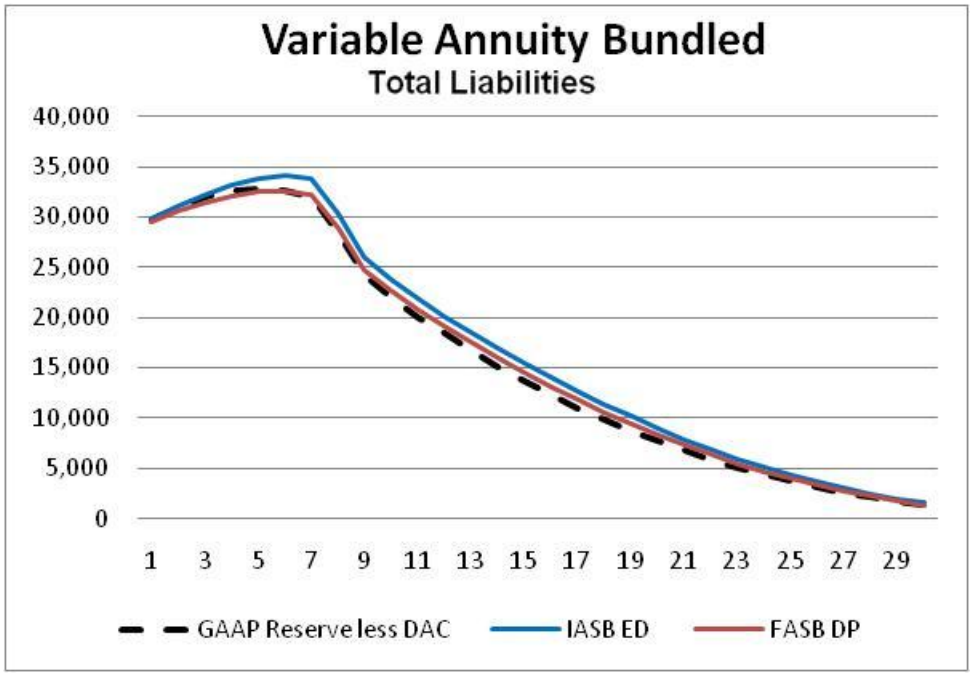


3.5.2 Liabilities for U.S. GAAP and baseline IFRS

Figure 3.5-2 provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP variation using a composite margin. For the unbundled approach, the values include both deposit and insurance components. The bundled results reflect a residual and composite margin in the liability. For the bundled results at issue, the risk adjustment and residual margin equals the composite margin. After issue the run off pattern creates differences in the liability total.

Figure 3.5-2.

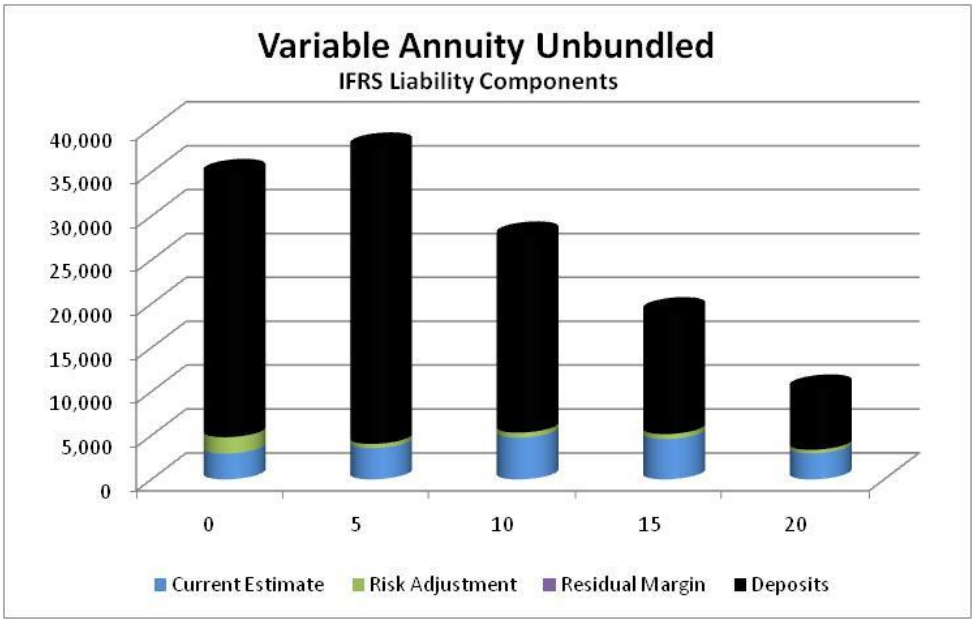


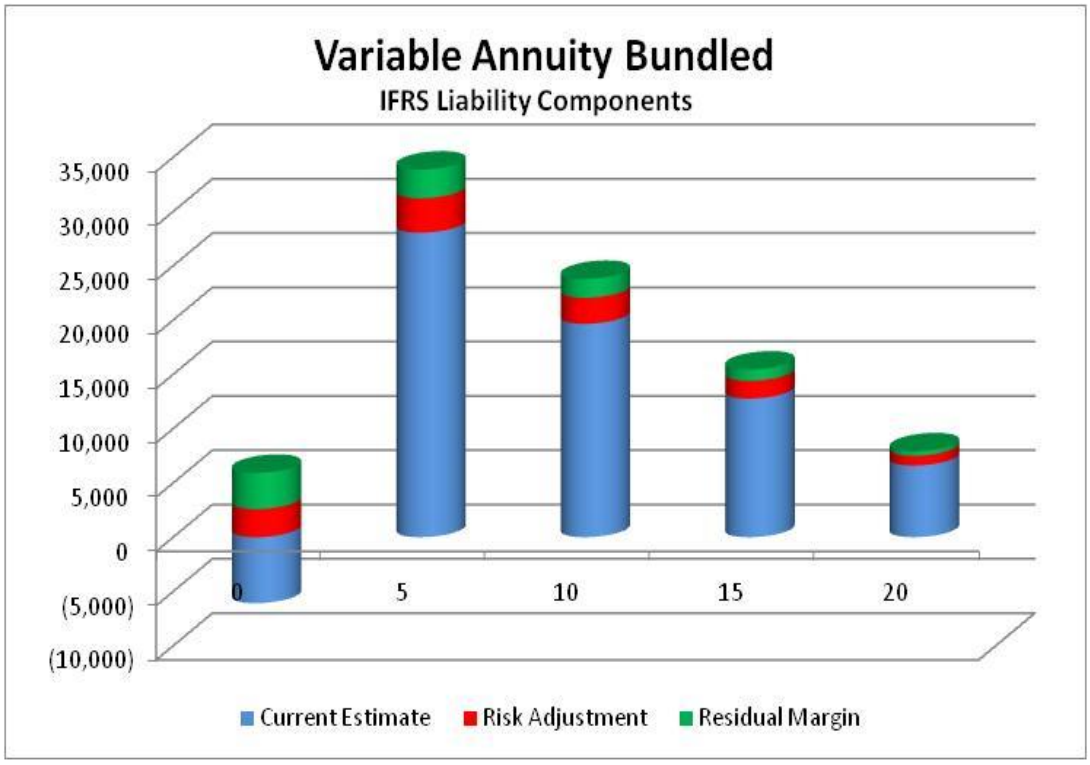


3.5.3 IFRS Liability Components

Components of the ED liability, including the account value, are shown in Figure 3.5-3 to assist in understanding the magnitude of the components in the liability. There is no residual margin for the unbundled example of this product, as it is otherwise determined to be negative, which is not allowed. The risk adjustment used in this study uses the cost of capital for risk adjustment used in this study.

Figure 3.5-3.

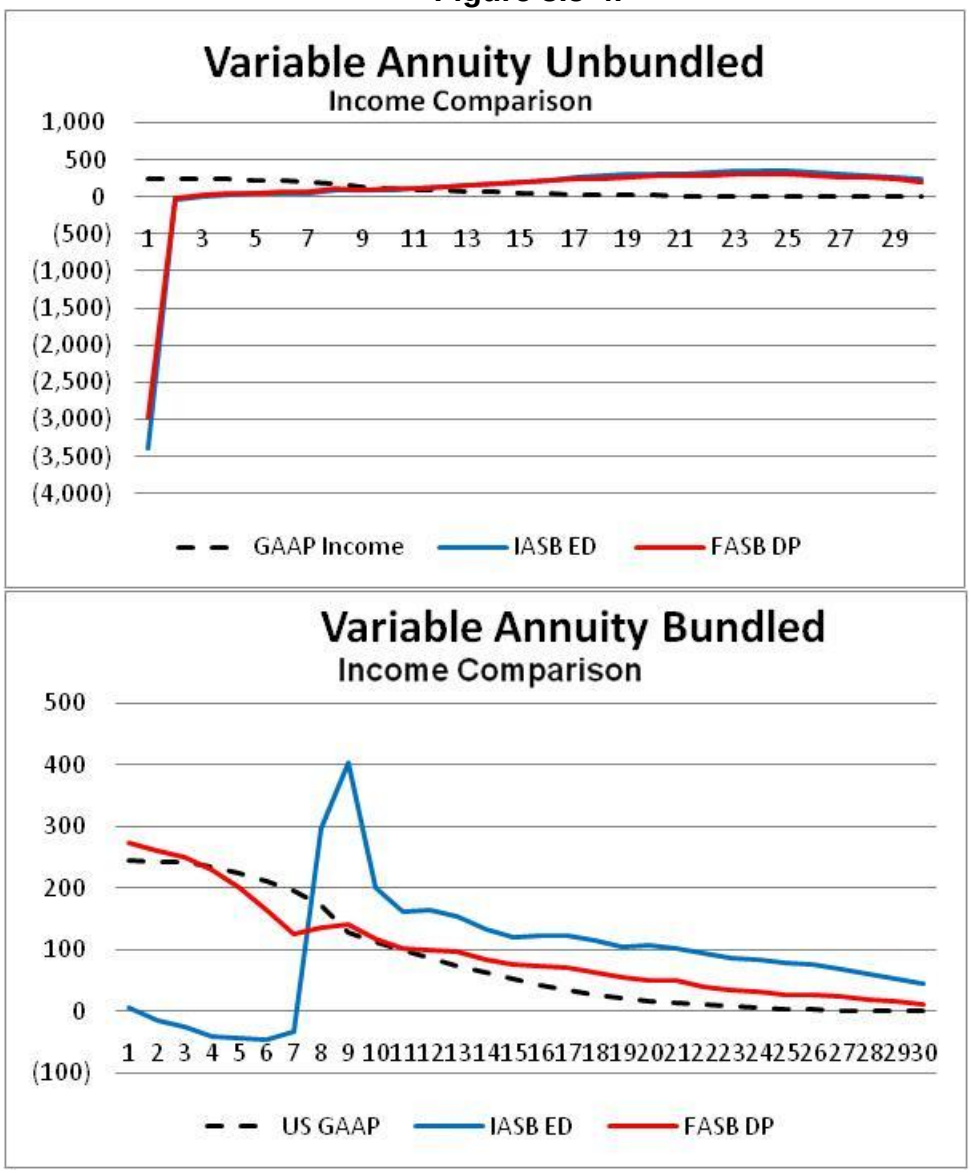




3.5.4 Income Statement Comparison

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.5-4. The initial loss in the unbundled ED and DP is due to initial acquisition expenses relative to the magnitude of the current estimate. There is a loss at issue under the unbundled approach whereas under the bundled approach there is a gain at issue. The ED bundled model shows spikes in years following the run off of the surrender charge as the benefits paid in those years are heavily driven by surrenders and with higher benefits more amortization of the residual margin occurs at that time.

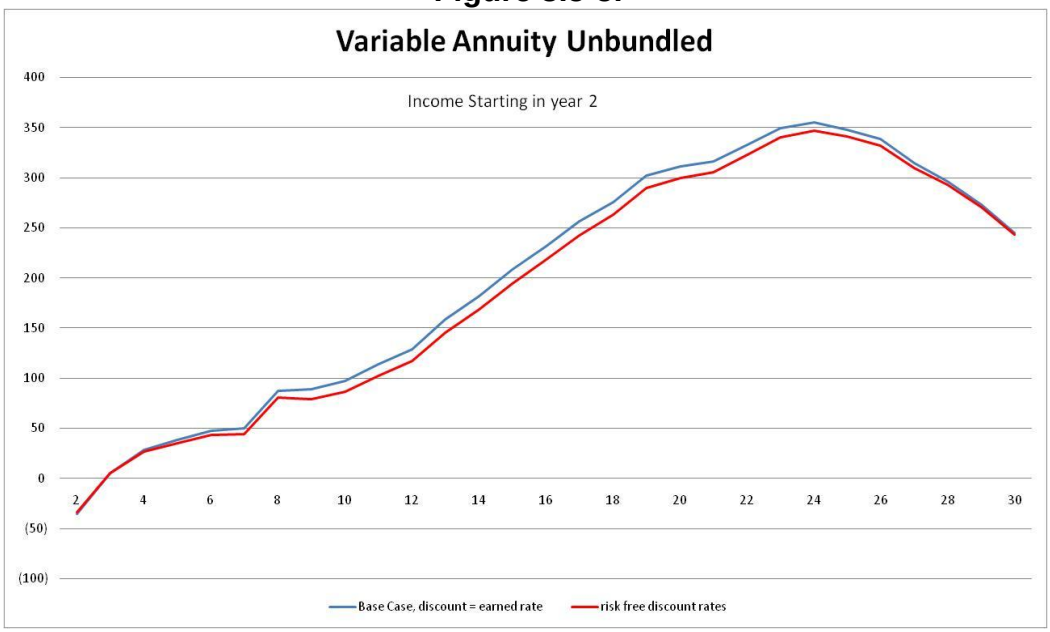
Figure 3.5-4.

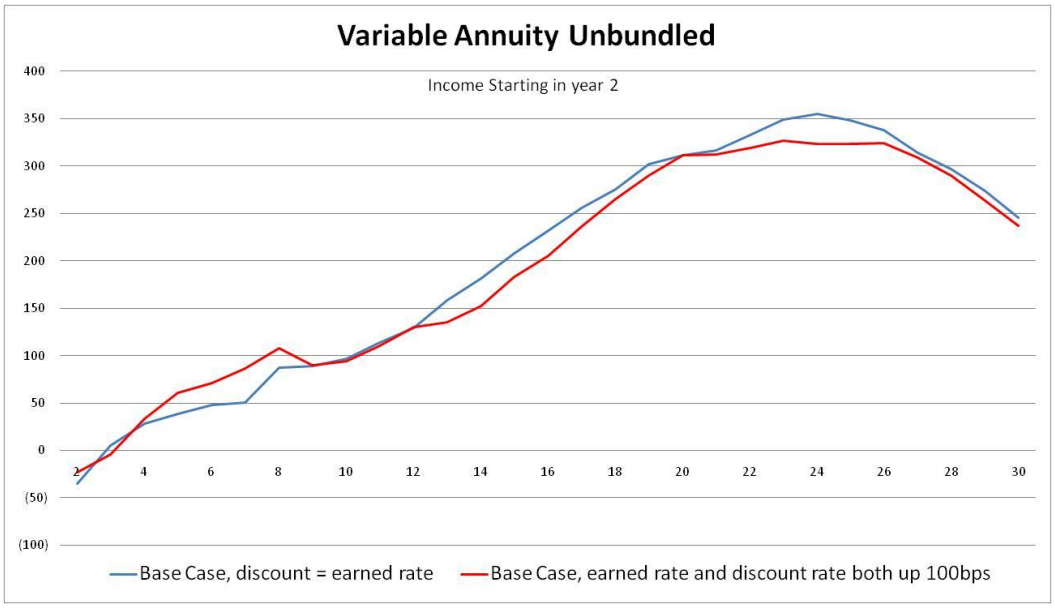


3.5.5 Sensitivities

Figure 3.5-5 shows the sensitivity of switching the discount rate from the separate account growth rate to the risk free rate [plus an illiquidity premium] as the discount rate. The relationship between the level of the risk free discount rates and net expected earned rates drives the difference in income. Figure 3.5-6 shows the effect of a permanent increase in both the discount rate and actual separate account investment return of 100 basis points. The variance in income reflects the higher fees received and the higher discounting. To provide a better graphical perspective, the loss in year 1 is not shown

Figure 3.5-5.





3.6 Supplementary Health Insurance

These contracts provide health care benefits depending on the contract, as a result of accidents, cancer or medical costs, based on a scheduled benefit. Some include a savings element and cash value. They are sold to both individuals and groups. Variation A involves accident coverage, variation B involves medical coverage, and variation C involves cancer coverage. It should be noted variation B is based on non-US discount rates, with a sensitivity to portray results using the US rates.

For U.S. GAAP, balance sheets and income statements were developed based on FAS 60, with liabilities equal to the expected cash flows of the contract, including a PAD, and a deferred acquisition cost asset. Since it was assumed that the products were issued on a profitable basis and that no adverse change in expectations occurred, the projections assume that no recoverability issues arise and that no premium deficiency reserve is needed. .

The cash flows underlying the IFRS results were based on the U.S. GAAP cash flow projections: that is, the probabilistic weighted average cash flows required for IFRS were assumed to be equal to the best estimate scenario used to produce U.S. GAAP results. The baseline IFRS liability is based on the present value of cash flows.

Health - Accident	Time 0	End of Year 1
Current estimate	- 11,347,323	- 13,064,973
Risk adjustment	333,654	251,807
Residual margin	11,013,669	8,812,350
Composite margin	11,347,323	9,887,827
Liability -- IASB ED	0	- 4,000,816
Liability -- FASB DP	0	- 3,177,147
Non-incremental acquisition cost	5,182,119	
Incremental-to-the-contract acquisition cost	7,902,802	

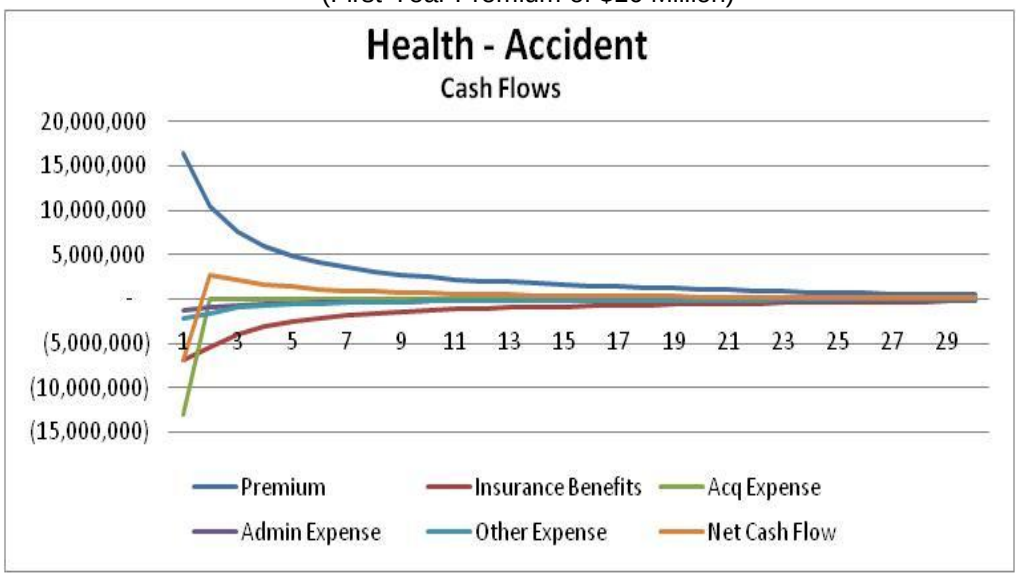
Health - Cancer	Time 0	End of Year 1
Current estimate	- 311,112	- 352,343
Risk adjustment	12,612	10,602
Residual margin	298,498	276,816
Composite margin	311,112	302,621
Liability -- IASB ED	0	- 64,924
Liability -- FASB DP	0	- 49,721
Non-incremental acquisition cost	118,174	
Incremental-to-the-contract acquisition cost	274,169	

Health - Medical	Time 0	End of Year 1
Current estimate	- 6,484,606	- 6,662,237
Risk adjustment	- 251,816	232,860
Residual margin	6,232,791	6,053,994
Composite margin	6,484,606	6,389,832
Liability -- IASB ED	0	- 395,383
Liability -- FASB DP	0	- 292,405
Non-incremental acquisition cost	2,075,114	
Incremental-to-the-contract acquisition cost	2,549,182	

3.6.1 Cash Flow Components -- Accident

Components of the measurement of the liability of the health insurance contracts are shown in Figure 3.6-1A. It shows the expected incidence and amount of the major elements of expected cash flows. Note that there is a fairly large contract termination rate.

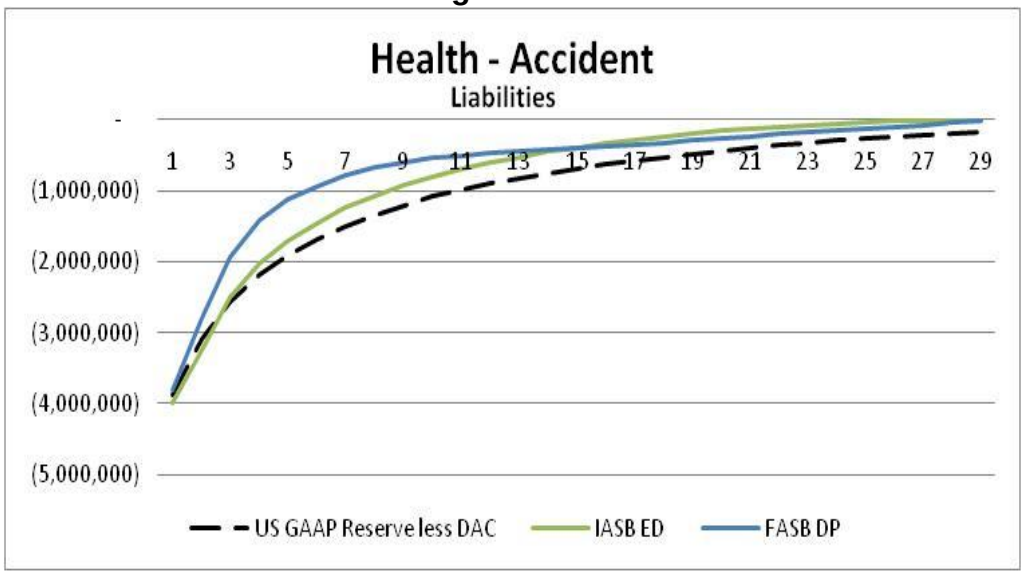
Figure 3.6-1A.
(First-Year Premium of $16 Million)



3.6.2 Liabilities for U.S. GAAP and baseline IFRS -- Accident

Figure 3.6-2A provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP variation using a composite margin. The underlying model for this product provides information that the cash flows relative to benefits paid are such that the net liability is negative under US GAAP and both IFRS basis. It is also interesting that for this product, since the initial premium persistency is low, the liability under the FASB DP approach has a different initial pattern compared to US GAAP and IASB ED. The behavior of the composite margin amortization related to premiums and benefits causes the rapid decline in the composite margin thus decreasing the liability initially.

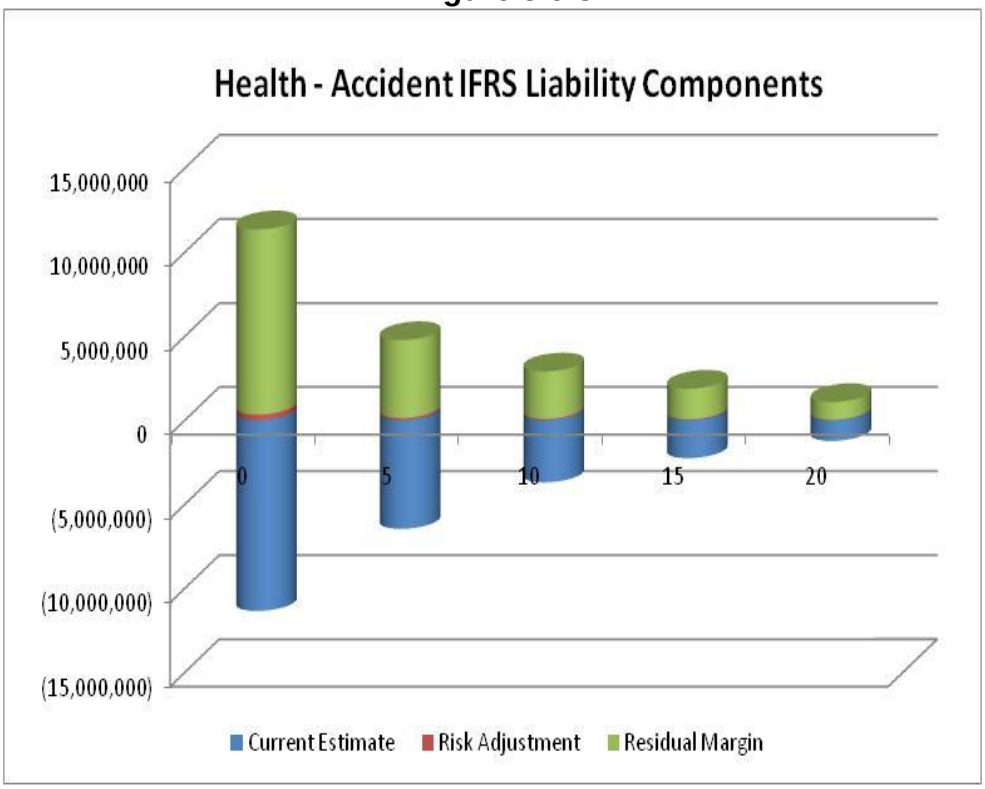
Figure 3.6-2A.



3.6.3 IFRS Liability Components -- Accident

Components of the ED liability at selected durations are shown in Figure 3.6-3A to assist in understanding the magnitude of the components in the liability. The risk adjustment component is minor relative to the residual margin for this product, and is determined under the convention using the cost of capital for risk adjustment used in this study. The residual margin is relatively large initially because it is expected to be a relatively profitable product.

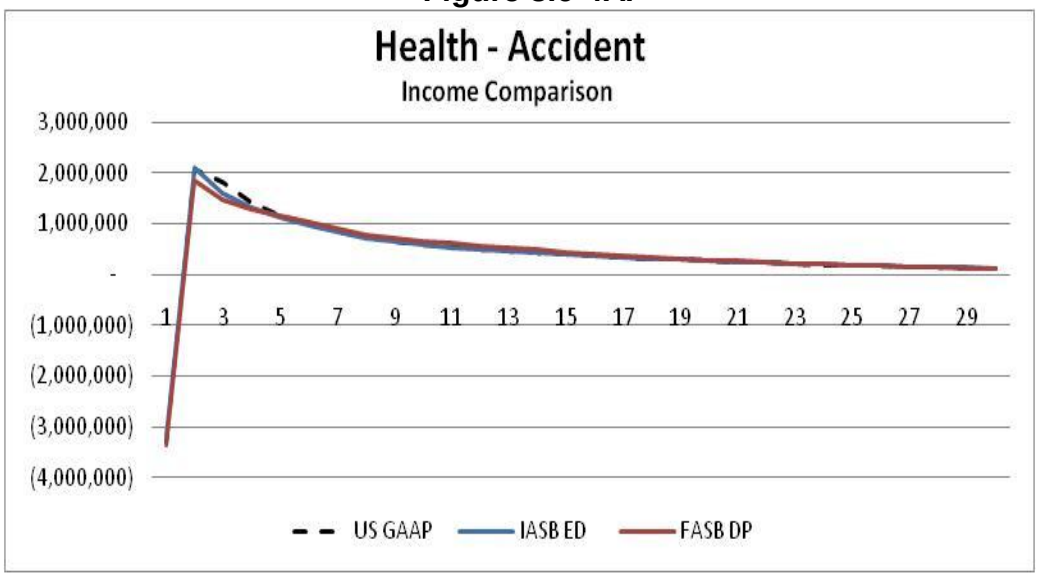
Figure 3.6-3A.



3.6.4 Income Statement Comparison -- Accident

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.6-4. The first year loss is due to the non-incremental acquisition cost (and in the U.S. GAAP case due to the non-deferrable acquisition cost).

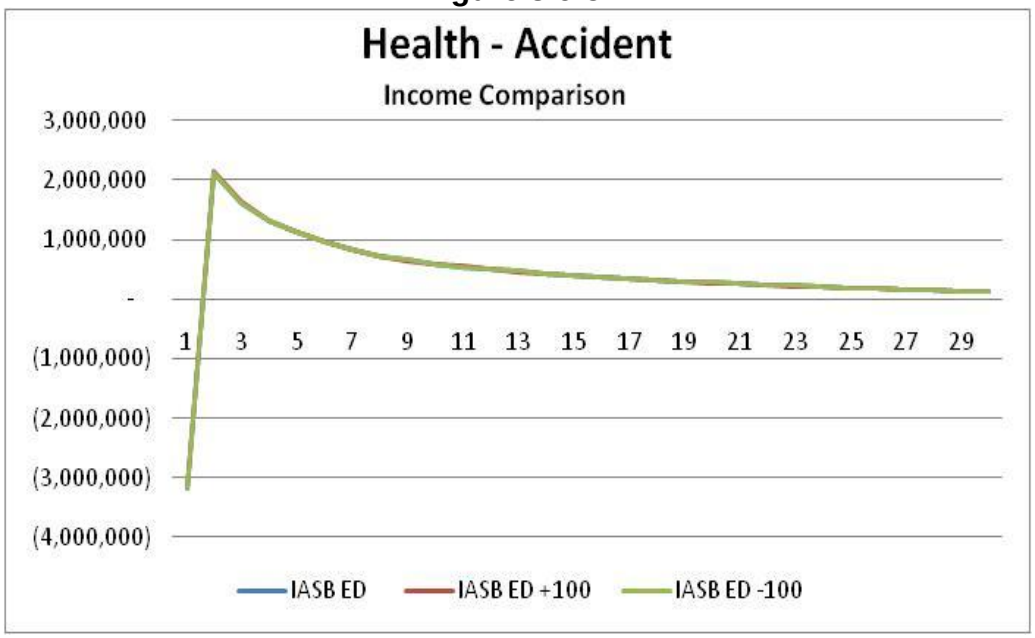
Figure 3.6-4A.



3.6.5 Sensitivities -- Accident

The amount of difference between the results with the shifts in discount rates of 100 basis points is minimal and virtually unnoticeable in Figure 3.6-5A.

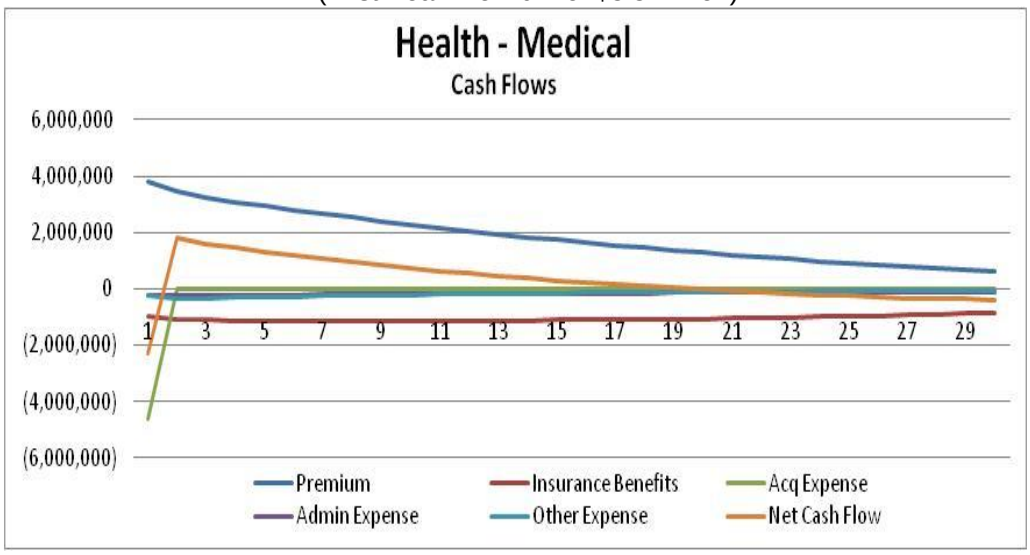
Figure 3.6-5A.



3.6.6 Cash Flow Components -- Medical

Components of the measurement of the liability of the health insurance contracts are shown in Figure 3.6-1B. It shows the expected incidence and amount of the major elements of expected cash flows.

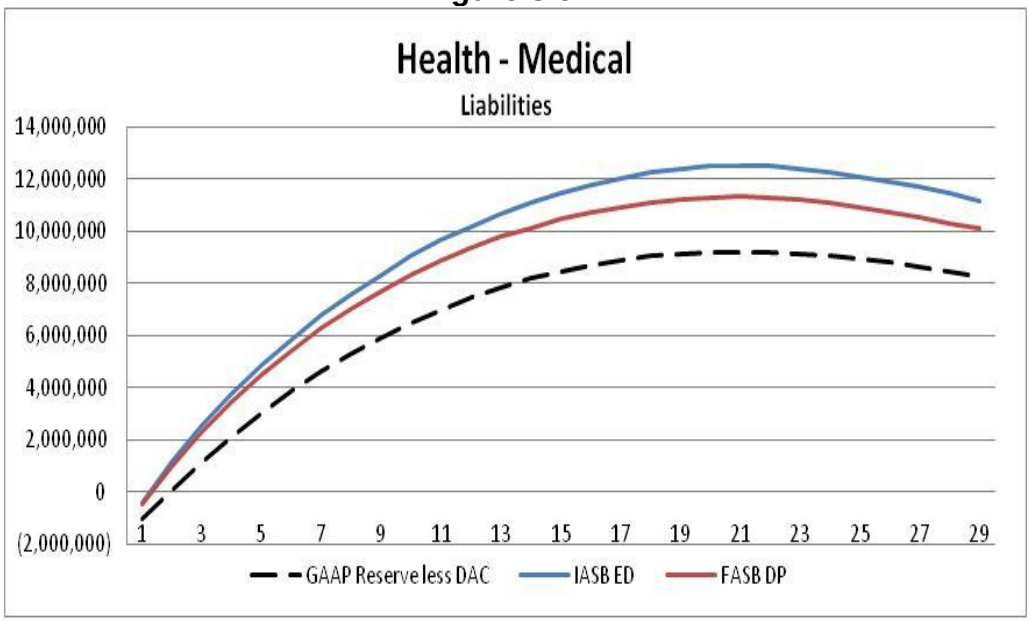
Figure 3.6-2B.
(First-Year Premium of $3.8 Million)



3.6.7 Liabilities for U.S. GAAP and baseline IFRS -- Medical

Figure 3.6-2B provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP variation. The difference between the IASB ED and the FASB DP variation is due to the different runoff approaches used for the residual and composite margin, respectively.

Figure 3.6-2B.

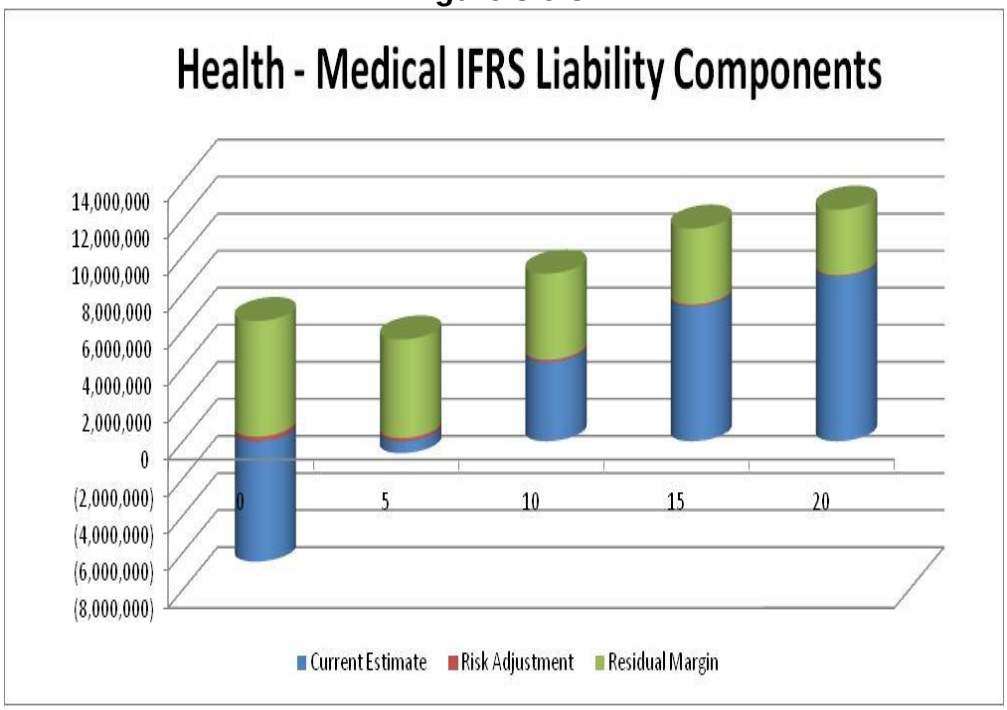


3.6.8 IFRS Liability Components -- Medical

Components of the ED liability at selected durations are shown in Figure 3.6-3B to assist in understanding the magnitude of the components in the liability. The risk adjustment component is minor relative to the residual margin for this product, and is determined under the convention using the cost of capital for risk adjustment used in this

study. The residual margin is relatively large initially because it is expected to be a relatively profitable product.

Figure 3.6-3B.



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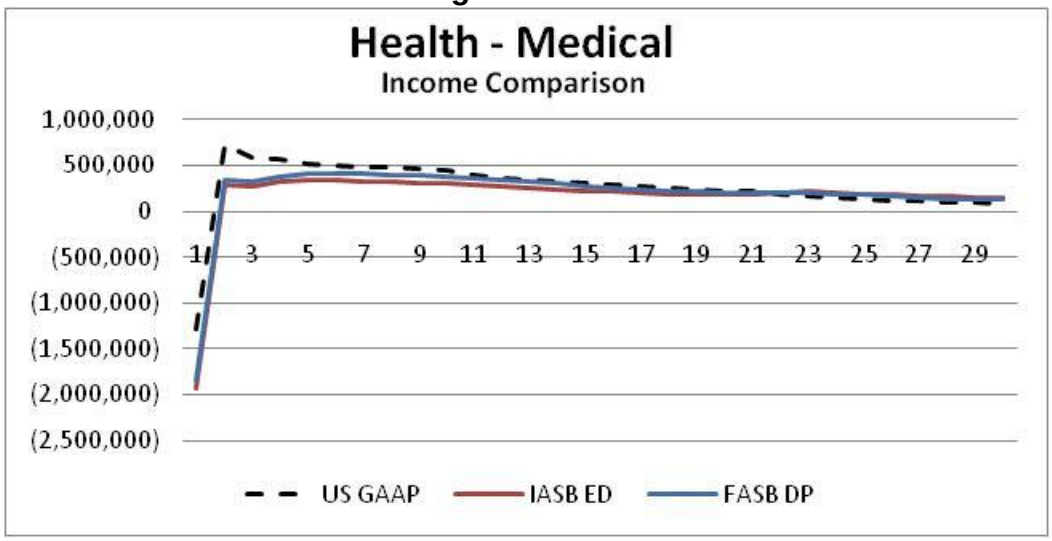
3.6.9 Income Statement Comparison -- Medical

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.6-4B. The first year loss is due to the non-incremental acquisition cost (and in the U.S. GAAP case due to the non-deferrable acquisition cost).

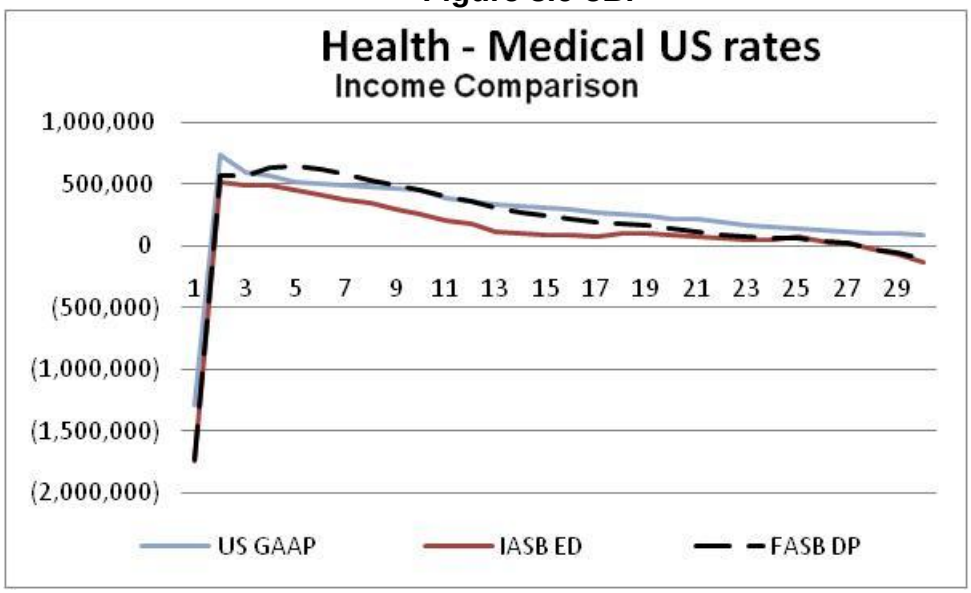
Figure 3.6-4B.



3.6.10 Sensitivities -- Medical

Figure 3.8-5B shows the effect of using the discount rates based on US discount rate sensitivity. It shows that a higher interest rate yield curve creates a larger residual margin that leads to a loss at issue and higher residual margin release.

Figure 3.6-5B.

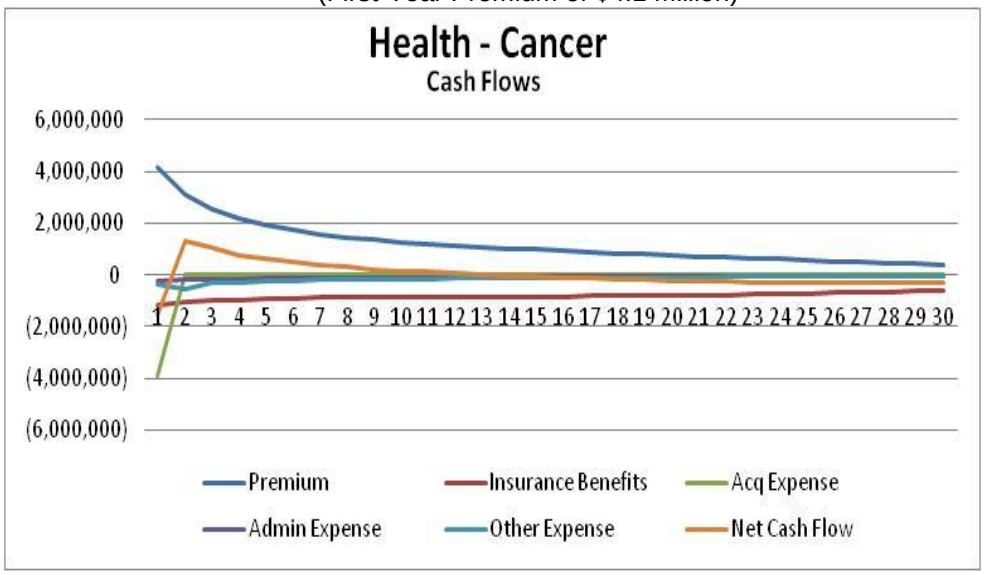


3.6.11 Cash Flow Components -- Cancer

Components of the measurement of the liability of the health insurance contracts are shown in Figure 3.6-1C that shows the expected incidence and amount of the major elements of expected cash flows.

Figure 3.6-1C.

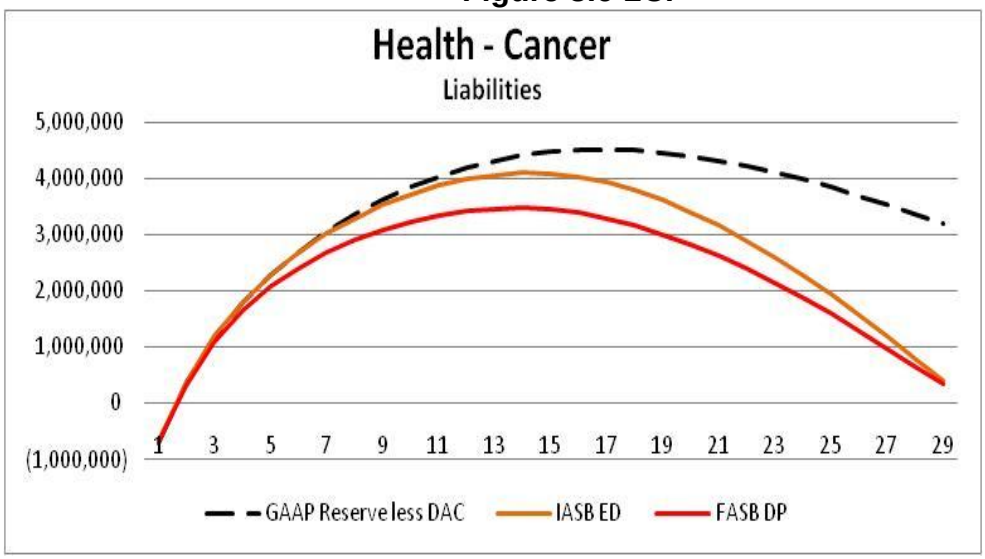
(First-Year Premium of $4.1 Million)



3.6.12 Liabilities for U.S. GAAP and baseline IFRS -- Cancer

Figure 3.6-2C provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP variation. The difference between the IASB ED and the FASB DP variation is due to the different runoff approaches used for the residual and composite margin, respectively.

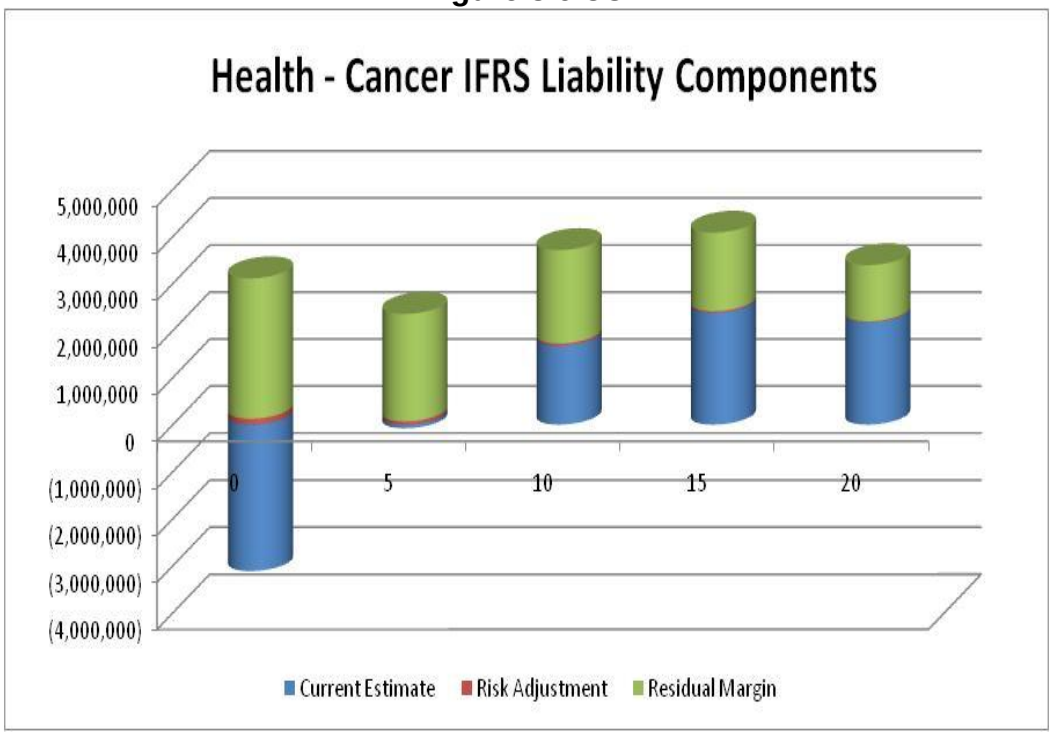
Figure 3.6-2C.



3.6.13 IFRS Liability Components -- Cancer

Components of the ED liability at selected durations are shown in Figure 3.6-3C to assist in understanding the magnitude of the components in the liability. The risk adjustment component is minor relative to the residual margin for this product, and is determined under the convention using the cost of capital for risk adjustment used in this study. The residual margin is relatively large initially because it is expected to be a relatively profitable product.

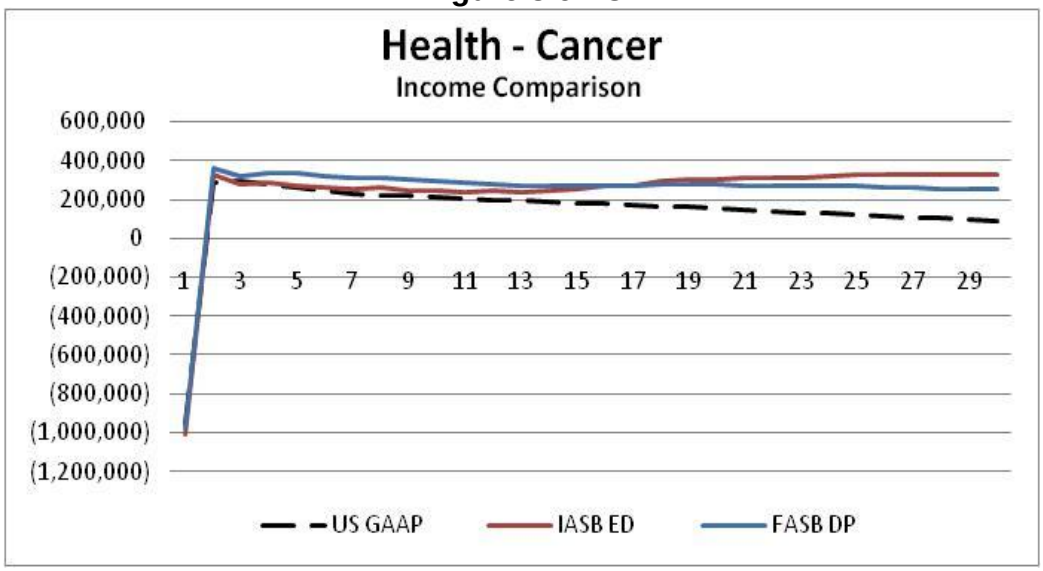
Figure 3.6-3C.



3.6.14 Income Statement Comparison -- Cancer

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.6-4C. The first year loss is due to the non-incremental acquisition cost (and in the U.S. GAAP case due to the non-deferrable acquisition cost).

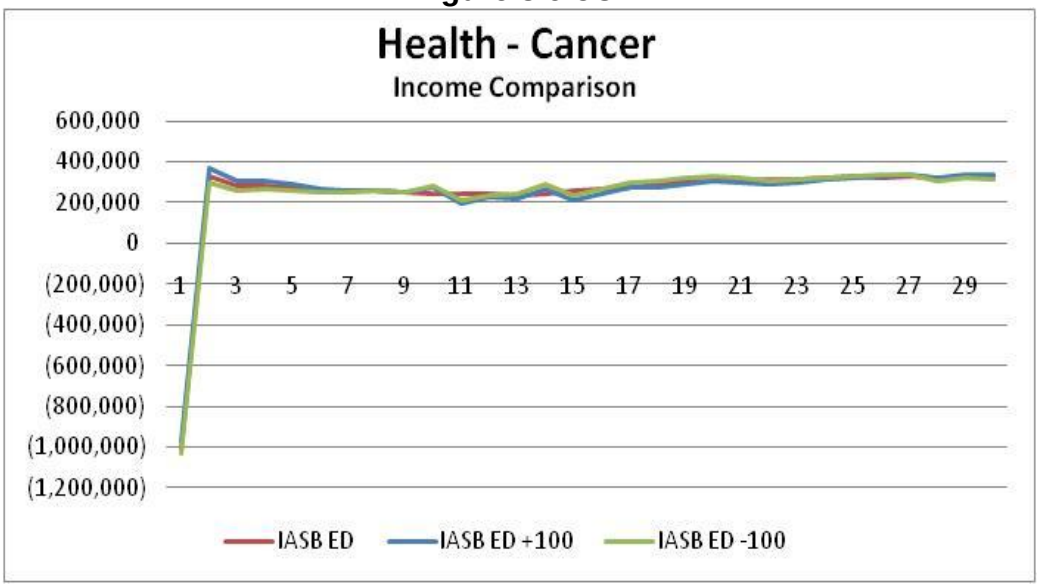
Figure 3.6-4C.



3.6.15 Sensitivities -- Cancer

The amount of difference between the results with the shifts in discount rates of 100 basis points is minimal for this contract and virtually unnoticeable in Figure 3.6-5C.

Figure 3.6-5C.



3.7 Medicare Supplement Health Insurance

These contracts are sold to individuals and groups, covering medical expenses of individuals who participate in the U.S. Medicare health insurance program, who uses these contracts to supplement their Medicare benefits. The premiums are payable

monthly. The liability for these contracts have typically included a small unearned premium liability (pre-claims liability) and a claim liability, for which the payout period is relatively short in duration. For the purpose of this report, the claims liability is not considered.

For U.S. GAAP, balance sheets and income statements were developed based on FAS 60 long-duration model, with liabilities equal to the expected value of cash flows and a deferred acquisition cost asset. The projections were based on best estimate assumptions, including a provision for adverse deviation, such as rates of morbidity and lapse. Since it was assumed that the products were issued on a profitable basis and that no adverse change in expectations occurred, the projections assume that no recoverability issues arise and that no premium deficiency reserve is needed.

The cash flows underlying the IFRS results were based on the U.S. GAAP cash flow projections: that is, the probabilistic weighted average cash flows required for IFRS were assumed to be equal to the best estimate scenario used to produce GAAP results. The baseline IFRS liability is based on the present value of cash flows.

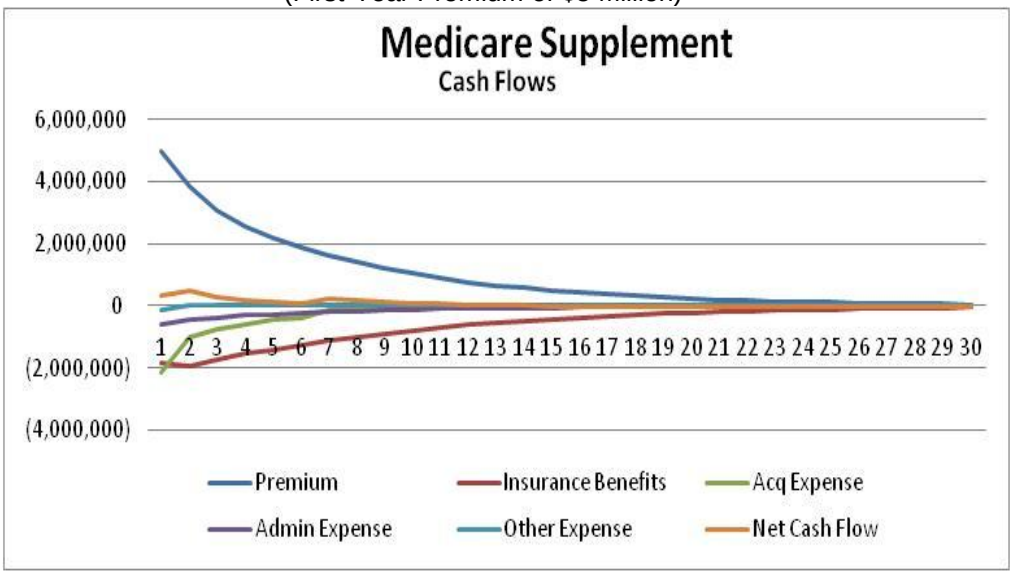
Medicare Supplement Health Insurance	Time 0	End of Year 1
Current estimate	- 1,857,863	-1,564,716
Risk adjustment	135,257	108,929
Residual margin	1,722,607	1,518,481
Composite margin	1,857,863	1, 592,159
Liability -- IASB ED	0	62,695
Liability -- FASB DP	0	27,444
Non-incremental acquisition cost	0	
Incremental-to-the-contract acquisition cost	2,135,872	

3.7.1 Cash Flow Components

The cash flows are fundamental to the measurement of the liability of the Medicare supplement insurance contracts. Figure 3.7-1 shows the expected incidence and amount of the major elements of these expected cash flows.

Figure 3.7-1. Medicare Supplement Health Insurance, Cash Flow Components

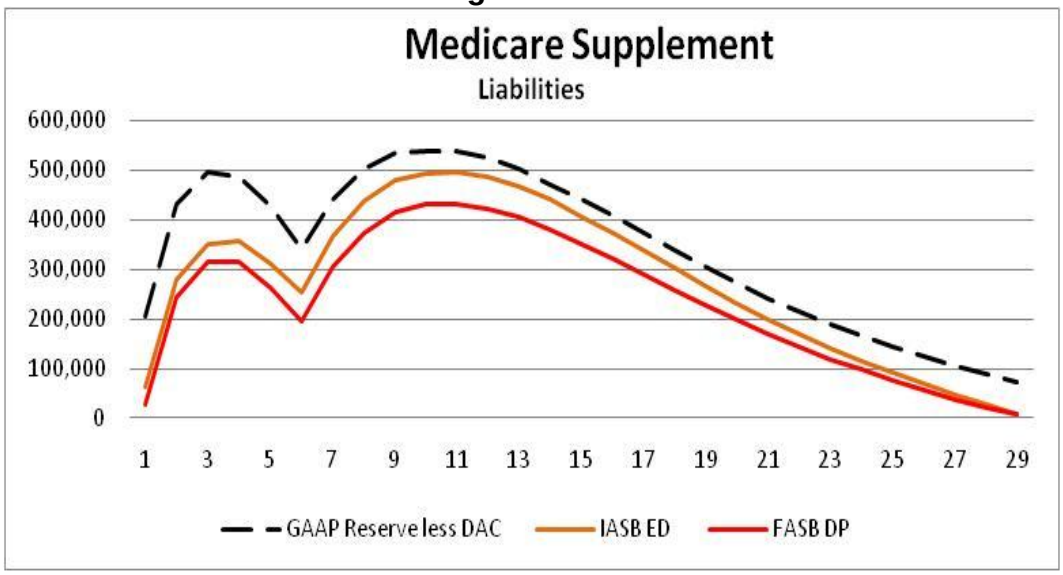
(First-Year Premium of $5 Million)



3.7.2 Liabilities for U.S. GAAP and baseline IFRS

Figure 3.7-3 provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP variation. The Net GAAP reserve change in years six and seven are related to the decline in deferrable acquisition costs as the commissions for the product decreases substantially after 5 years.

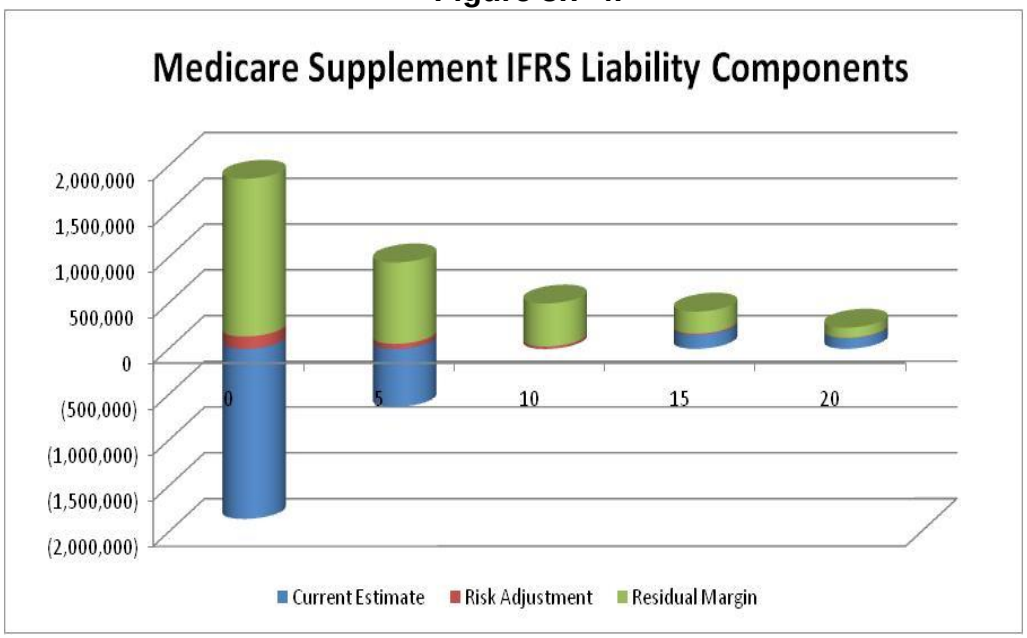
Figure 3.7-3



3.7.3 IFRS Liability Components

Components of the ED liability at selected durations are shown in Figure 3.7-4 to assist in understanding the magnitude of the components in the liability. The risk adjustment component is minor relative to the residual margin for this product, and is determined under the convention using the cost of capital for risk adjustment used in this study. The residual margin is relatively large initially because it is expected to be a relatively profitable product.

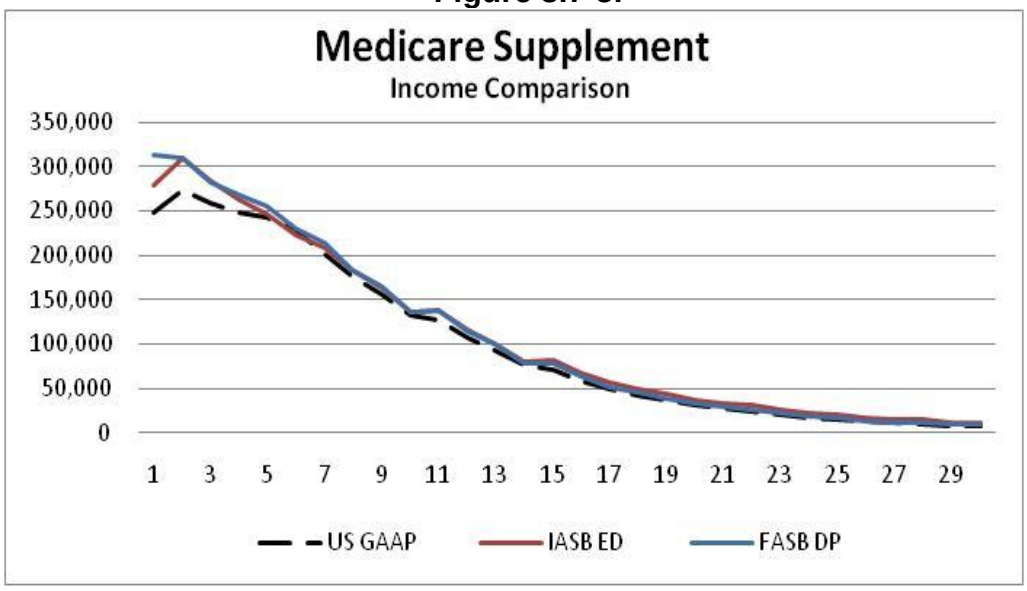
Figure 3.7-4.



3.7.4 Income Statement Comparison

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.7-5.The ED and DP results vary by less than 10,000 and thus the lines are not distinct for this scale.

Figure 3.7-5.



3.8 Long-Term Care Insurance

These contracts provide various assisted living benefits, predominantly through nursing home and home health care providers. Their premiums are guaranteed renewable, that is, future premiums can be modified on the basis of future experience of the contract series, but not on an individual participant basis, with regulatory approval required. They are sold to groups or to individuals. Their liability consists of both a contract liability (pre-claims) and a post-claims period. Most do not have a cash value although some have a non-cash non-forfeiture benefit.

For U.S. GAAP, balance sheets and income statements were developed based on FAS 60, with liabilities equal to the expected value of cash flows, and a deferred acquisition cost asset. The projections were based on best estimate assumptions, such as rates of morbidity and lapse, including a provision for adverse deviation (PAD). Since it was assumed that the products were issued on a profitable basis and that no adverse change in expectations occurred, the projections assume that no recoverability issues arise and that no premium deficiency reserve is needed.

The cash flows underlying the IFRS results were based on the U.S. GAAP cash flow projections: that is, the probabilistic weighted average cash flows required for IFRS were assumed to be equal to the best estimate scenario used to produce U.S. GAAP results. The baseline IFRS liability is based on the present value of cash flows.

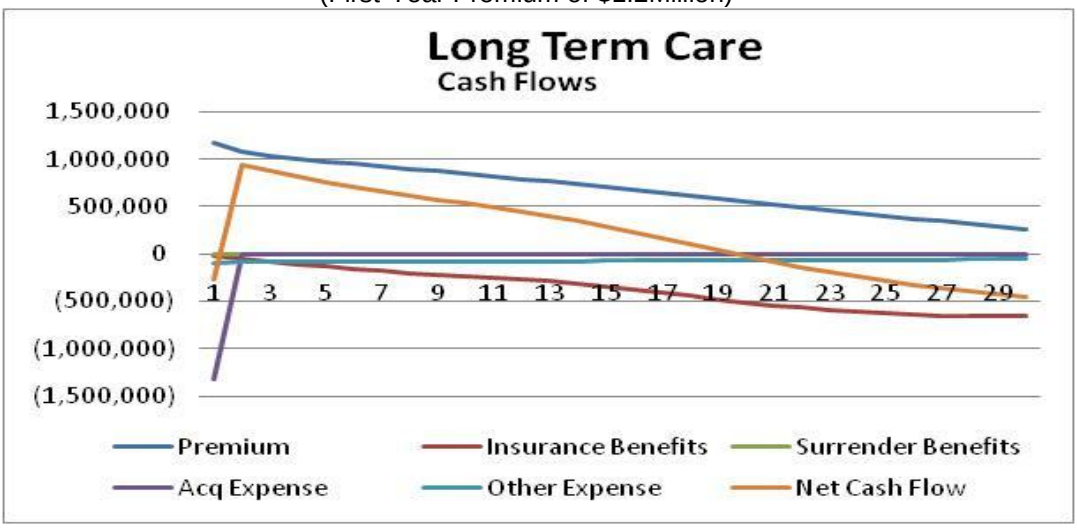
Long-Term Care	Time 0	End of Year 1
Current estimate	- 5,446,937	- 5,097,643
Risk adjustment	481,162	450,886
Residual margin	4,965,775	4,994,074
Composite margin	5,446,937	5,352,702
Liability -- IASB ED	0	347,317
Liability -- FASB DP	0	255,060
Non-incremental acquisition cost	659,320	
Incremental-to-the-contract acquisition cost	659,320	

3.8.1 Cash Flow Components

Components of the measurement of the liability of the LTC insurance contracts are the expected cash flows. Figure 3.8-1 shows the expected incidence and amount of the major elements of these cash flows.

Figure 3.8-1.

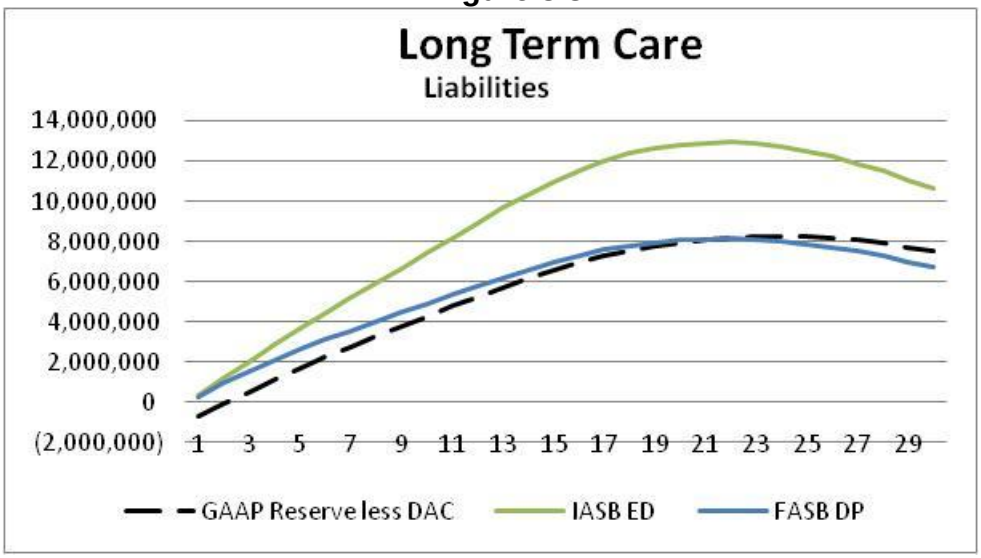
(First-Year Premium of $1.2Million)



3.8.2 Liabilities for U.S. GAAP and baseline IFRS

Figure 3.8-2 provides a comparison of the (net of DAC asset) liabilities for U.S. GAAP and for the IASB ED and FASB DP variation. The large difference between the IASB ED liabilities and the liabilities under the other two methods results from the growth in the residual margin due to accretion of interest being greater than its amortization for many years.

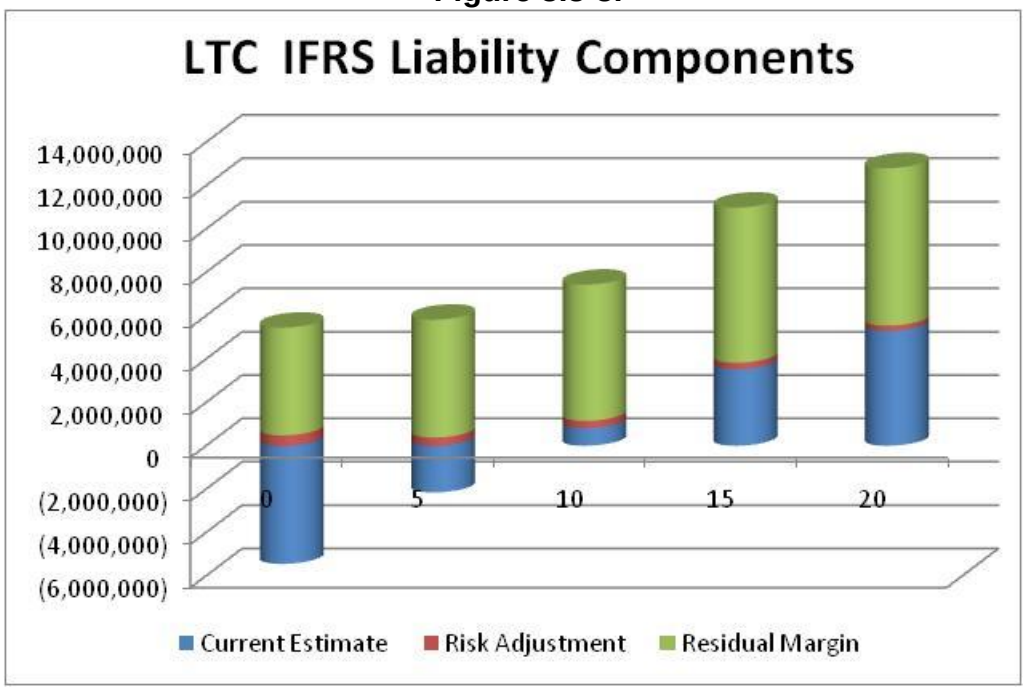
Figure 3.8-2.



3.8.3 IFRS Liability Components

Components of the ED liability at selected durations are shown in Figure 3.8-3 to assist in understanding the magnitude of the components in the liability. The risk adjustment component is minor relative to the residual margin for this product, and is determined under the convention using the cost of capital for risk adjustment used in this study. The residual margin grows through accretion of interest being greater than its amortization for many years.

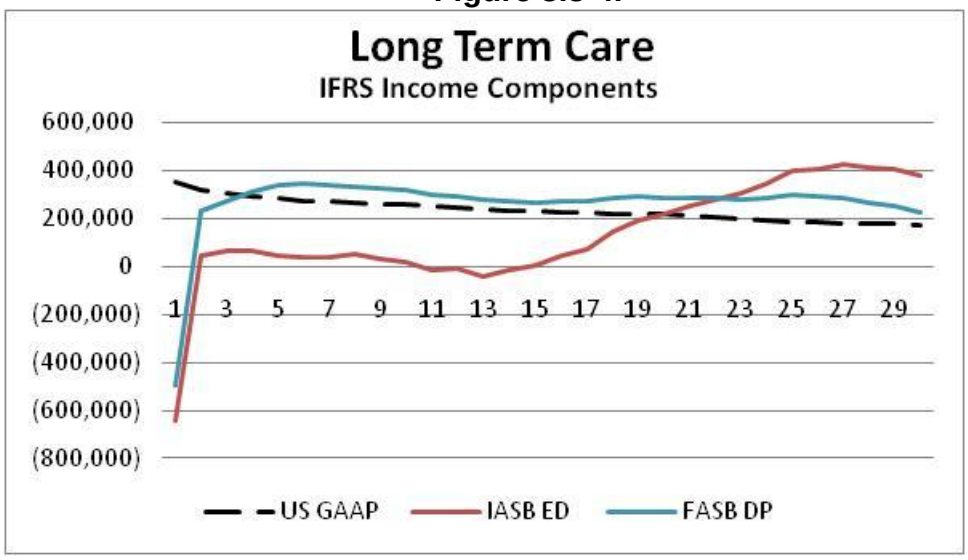
Figure 3.8-3.



3.8.4 Income Statement Comparison

A comparison of income statements under U.S. GAAP, the ED and the DP variation are shown in Figure 3.8-4. The difference is primarily as a result of differences in recognition of residual margins.

Figure 3.8-4.



3.8.5 Sensitivities

Sensitivities were run to illustrate the following effects: (1) of not incorporating any acquisition costs in year 1, (2) of an improvement in morbidity compared to initial expectations, (3) of a one-time increase in investment income, and (4) of a change in discount rates.

Figure 3.8-5 shows the sensitivity of income pattern to the recognition of no acquisition costs in the CE in the IASB ED or FASB DP method. The loss that follows in year 1 due to actual acquisition expenses being charged and not captured in the CE leads to a larger residual or composite margin liability that then creates higher later year profits as the margin is released. If all expenses were included in the CE calculation one would expect the reverse, smaller year 1 loss followed by lower future income. If all expenses were excluded in the CE calculation one would expect the reverse, smaller year 1 loss followed by lower future income, although this effect in not illustrated here.

Figure 3.8-5.

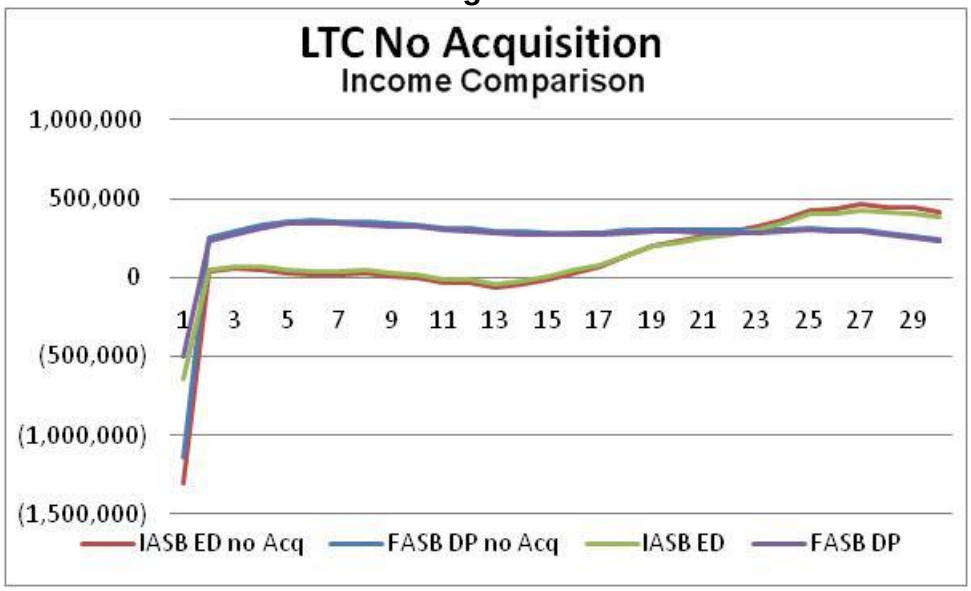
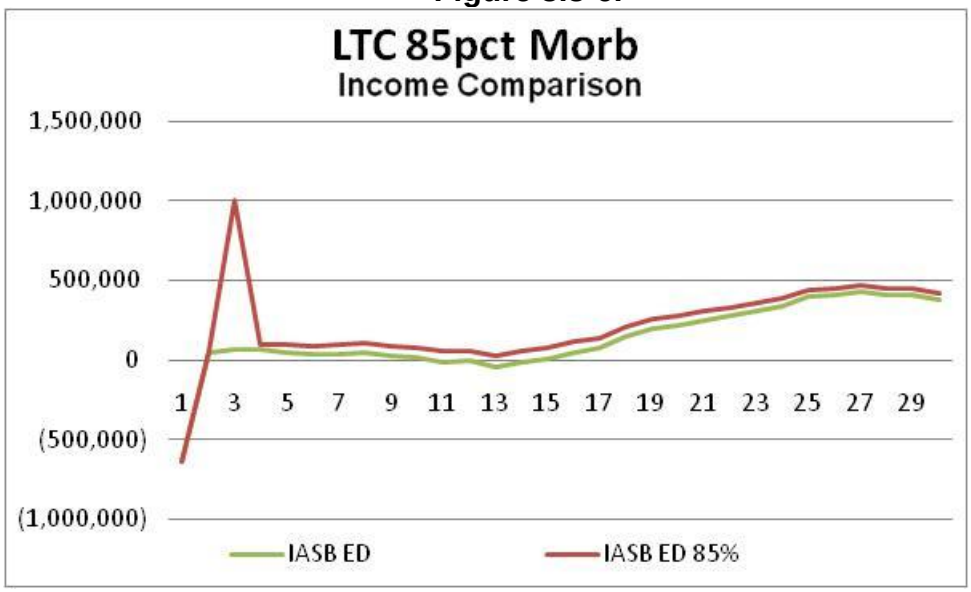


Figure 3.8-6 shows the sensitivity of income to a 15% reduction in morbidity at the end of year 3 through a permanent shift in the expected benefits after that date. The change in the morbidity assumption generates a large decrease in the CE, which is captured in its entirety in year 3, since the residual margin is not adjusted but is locked in at issue (except for unfavourable persistency).

Figure 3.8-6.



The increase in income in later periods is related to the use of GAAP liabilities for the investment income. When we substitute the IFRS liability as the source for investment income for the corresponding net U.S. GAAP liability the only income effect is in year 3 as was expected. Figure 3.8-7 shows this.

Figure 3.8-7

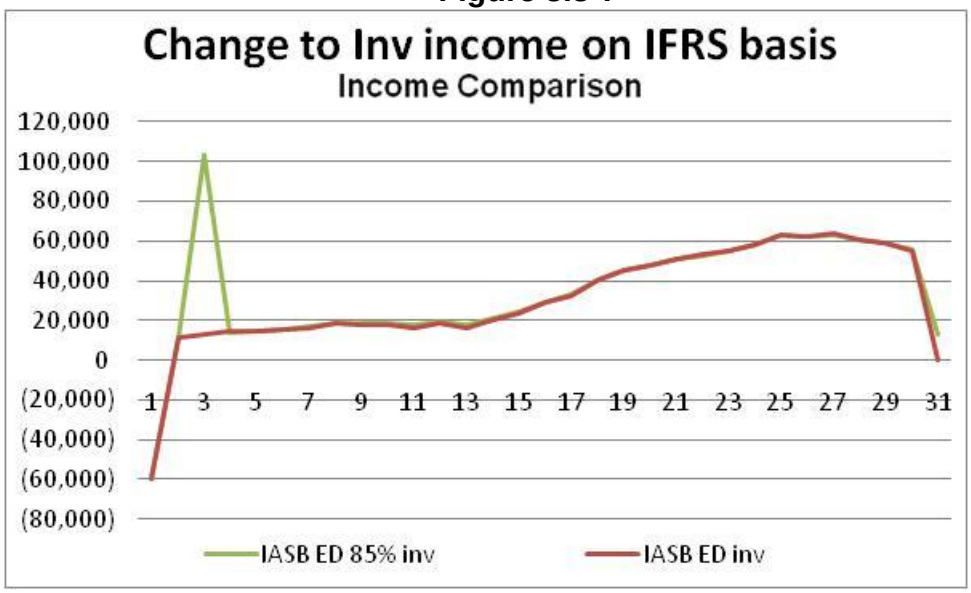
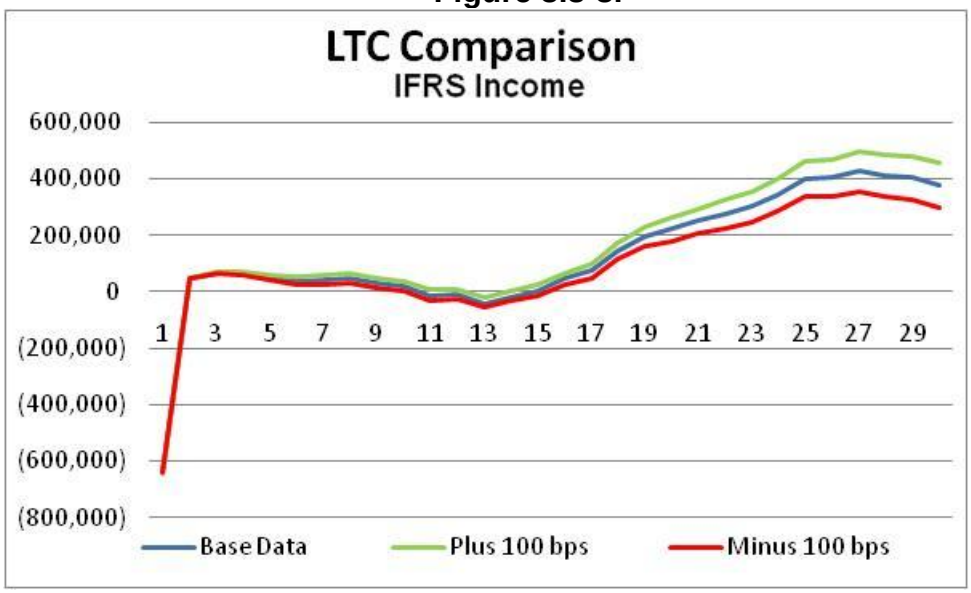


Figure 3.8-8 shows the effect on income of a change in discount rates of +/-100 basis points that could be caused, for example, by an increase in the underlying risk-free rate.

Figure 3.8-8.



4. Observations

The following is a summary of general observations regarding some of the issues and alternative sensitivities studied over the course of the project and shown in Section 3 of this report. Additional comments regarding practicality are provided in Section 5.

4.1 Unbundling

The use of a different measurement approach for the deposit component of a bundled (including insurance and deposit elements) contract can affect not only the revenue recognized (depending on the accounting standard applied), but also liabilities and resultant income. There has been some confusion regarding the ED over both when a contract needs to be unbundled and how such unbundling should be measured, the latter of concern where there is some inter-relation between the components. This report illustrates the possible effect of unbundling in contracts with an explicit account balance, for certain universal life (UL-1 and UL-2) and variable annuity contracts.

A simple approach to unbundling would be to split the two components by subtracting the account value from the bundled contract. An alternative would be to split the two components by measuring the insurance component using a fee (sometimes referred to as a margin) based approach, with the cash flows to and from the account value being treated as analogous to the cash flows for the insurance component, as described in Section 1.4. The effect of this approach is shown in Sections 3.2 (for UL-1 and UL-2) and 3.5, with alternative liabilities and income from each. A difference in income and liability values might also result from the imposition of a minimum account value or cash value floor to the combined or separate components, which has not been applied here. It may be concluded that it is not desirable to unbundle a contract such as universal life insurance or variable annuities in the manner illustrated.

4.2 Acquisition Costs

The incurral of non-incremental-to-the-contract acquisition costs results in a loss at the time of the issuance of the contract for the IASB ED or the FASB DP measurement approaches to the extent that the incremental-to-the-portfolio exceeds the incremental-to-the-contract acquisition costs (that is, between variable and marginal expenses). This is similar to a corresponding loss at the time of the issuance of the contract under U.S. GAAP to the extent of any non-deferrable acquisition costs incurred at issue. The alternative shown is the effect of not incorporating any acquisition costs in the building block 1 calculation, shown in Figures 3.1-8 and 3.8-5.

4.3 Experience

The sensitivity to additional expected morbidity shown in Figure 3.8-6 for long-term care insurance provides an example of how different levels of expected experience can affect income and liabilities. The effect on results applying the IASB ED is captured in their entirety at the point in time when the underlying assumption change is recognized. This effect is similar to the income treatment under U.S. GAAP when loss recognition or unlocking occurs. The effects of a change in investment income (along with simultaneous changes in discount rates) are shown in Figures 3.1-11, 3.2-17 and 3.5-6.

4.4 Discount Rates

4.4.1 Yield Curves

The yield curve used in this study corresponds to observed prices for U.S. government securities (or the applicable government rate in the two non-U.S. products). The one year forward rates derived from them were smoothed, due to kinks in the observed values at December 31, 2009, as shown in Appendix 7.1. A reason for the

volatility in the one year forward rates in durations 11-15 were the result, in part, to the relatively smaller volume of trades in the corresponding origination period (at a time during the 1990's when the U.S. federal debt was decreasing). This implies that further techniques may be needed in deriving market-based yield curves in countries in which capital markets or prices on government debt securities may not provide a reliable base for use in discount rates. The effects of shifts in the yield curve are shown in Figures 3.1-9, 3.2-16, 3.4-8 and 3.4-9, 3.5-5, 3.6-5C and 3.8.8.

4.4.2 Liquidity adjustment

As mentioned in Section 2.2.2 that discusses discount rates as described in the ED, a liquidity adjustment was applied. As seen in Figure 3.4-10 the application of such an adjustment can make the difference between a gain and loss at issue. Further practical techniques for such an adjustment are needed regarding the shape and amount of the liquidity adjustment that may vary by type of contract and duration.

4.4.3 Obligations in Part or Totally Dependent on a Designated Set of Assets

The price and performance of many long duration contracts are dependent in part or in total on the investment performance of a designated set of assets. Examples shown here are participating whole life and variable annuities. Sensitivities to variation are given in Sections 3.3.5 and 3.5.5 based on the expected earned rate. These show that the liabilities and income can differ, in some cases significantly, due to the basis of discount rates used. Another approach, using a split discount rate is shown in Figure 3.3-6 with the risk-free plus liquidity adjustment applied to all expected cash flows other than policyholder dividends, while the expected earned rate was applied to the policyholder dividends. The possible effect of paragraph 32 of the ED on the liabilities for contracts other than participating whole life, such as universal life insurance, that may be viewed as being in part in part dependent was not explored in this project.

4.5 Risk Adjustments

Increasing the amount of economic capital used in the cost of capital method for the estimation of the risk adjustment in the baseline IFRS liability by a factor of two, as done in this study in Figures 3.2-15 and 3.4-7 has the effect of increasing the risk adjustment and decreasing the residual margin at issue, while also changing the pattern of release of the adjustments and margins. In most cases, because the risk adjustment as applied in this project is relatively small compared with the total liability, this sensitivity does not have a significant effect overall. Because the method used in this study was factor-based, the effect of this adjustment depends on the factors selected. Although it is likely that the baseline risk adjustment as illustrated has been somewhat understated (due in part to the lack of reflection of calamity risk, risk preference, and policyholder behaviour), in some cases it may not be as significant as the residual margin. Further quantitative studies of alternative approaches to estimating the risk adjustment is appropriate.

Although three risk adjustment techniques were applied to UL-1 (Figure 3.2-5), it is difficult to come to any conclusions based on these results, as the CI and CTE approach applied only using a normal probability distribution and all three methods do not fully cover all of the risk and uncertainty elements in the insurance contract.

4.6 Residual / Composite Margins

If there is a residual margin in a portfolio of insurance contracts, the method of amortizing or running it off can have a significant effect on the income for longer duration contracts, especially ones with high contract persistency. The difference between the use of (1) expected benefits and claims and (2) coverage amount for this purpose can be significant, especially for contracts whose benefits and claims are back-end loaded, such

as term life, participating whole life and long-term care insurance. The differential effect of amortization on the basis of benefits and claims and on the basis of coverage amount is shown in Section 3.1-6. The effect of the use of present values also can have a significant effect. This accretion of interest may cause the residual margin to increase above the initial residual margin in certain situations during periods in which the accretion of interest is greater than the amortization of the residual margin balance. Under the FASB DP approach, the composite margin does not reflect interest and thus is always less than the initial composite margin amount. The difference between the subsequent measurement of the residual and composite margins can be seen in many of the figures with both IASB ED and FASB DP liabilities and income (although somewhat clouded by the different release of the risk adjustment).

5. Practicality

This section includes a discussion of some of the significant practical concerns that were raised in the course of this project as they relate to a full implementation of the ED proposal. They are categorized as relating to the modelling of the liabilities (Section 5.1) and other observations (Section 5.2).

5.1 Modelling Issues

The ED proposal indicates that the cash flows used in the measurement of the liability should be estimated on a probability weighted basis and then discounted for the time value of money, with a risk adjustment reflecting the views of market participants and a residual margin that is an amortized value of its initial balance. Although there is a certain amount of application guidance in the ED, further educational guidance of a technical nature from the actuarial profession may be needed to prepare actuaries to develop estimates appropriate for use in the standard adopted.

As part of the implementation of the revised standard, models may need to integrate stochastic variations in such factors as persistency, mortality/morbidity, investments and other costs. Often such existing models have been constructed only by varying their investment component to project future cash flows stochastically. It is noted in the ED that not all cases will require such sophisticated modelling.

Many U.S. life insurers have developed models to support actuarial opinions with regard to regulatory liabilities, pricing, and asset and capital adequacy testing purposes (e.g., for implementation of valuation requirements adopted by the NAIC). It is possible that those models may be able to produce the cash flow projections needed to determine parts of the ED proposal. However, significant challenges will nevertheless arise to reflect properly the interrelationships among the expected experience and risk elements that drive the future cash flows. In addition, these models have historically been used in a non-production environment with moderate time frame requirements. The short time frames available to produce 'exact' and auditable quarterly or monthly financial reporting values for liabilities for insurance contracts will represent a considerable calculation challenge for many insurers, particularly those without deep and experienced actuarial staffs.

In many but not all U.S. insurance products, complicated contract features (embedded options and guarantees, and insurer strategies that are used to manage these risks, including those related to hedging programs) exist that will result in significant complexity in creating models for this purpose. As a result, acceptable modelling approximations may have to be developed that are both adequate in the assessment of the risks involved and yet transparent enough to enable adequate auditing and user understanding of the work product.

The modelling conducted during the course of this project involved several product and methodological simplifications. For example, the insurance risk associated with variable annuities after annuitization was ignored as not being material because, at the time of issue, this insurance risk was not deemed to be material for the first thirty policy years; however, as values will be needed for all contract durations, such assumptions may have to be tested for the life of the contracts and modeled, where deemed potentially significant. Other examples include the use of judgementally determined incremental acquisition expenses, and a simple capital model applied in place of a rigorous economic capital model in the cost of capital method for risk adjustments. The effort needed to rigorously apply the final standard should not be underestimated.

Staff at many relatively small companies are not accustomed to the more sophisticated modelling that may be needed for this purpose. Adequate education and guidance will be needed for them to implement adequate models for this purpose.

In some cases, different interpretations were applied to the ED proposal by different ATFs, even with the detailed discussion provided in the ED and an educational

webcast provided to the ATF members regarding this proposal. Although the final standard is expected to provide more clarity than the ED in areas such as unbundling, different interpretations will be inevitable, due in part to the complex nature and wide variety of many insurance contracts worldwide.

The basic models used to develop the cash flows for this project were primarily those currently in existence. Based on changes from current practice (e.g., risk adjustments, residual margins by cohort, updated market-based discount rates, explicit measurement methods, and measurement of embedded options and guarantees), a considerable period for implementation will be needed to develop valuation systems from scratch, particularly in view of audit requirements that historically have not been applied to similar models used for cash flow testing or economic capital calculation purposes.

5.2 Other Observations

Several additional aspects of a practical nature other than modelling have been apparent throughout the course of this project. In some cases these were avoided by means of the use of simplified assumptions, while in others they were not relevant to the modelling that was conducted in the context of this project. These include:

1. *Risk adjustment methodologies.* The fact that only one ATF was willing or able, due to either technical knowledge or availability of resources, to derive risk adjustments by a method other than that prescribed in Section 2.2.2 (the ATF that modelled variable annuities was able to apply current models already used for U.S. statutory purposes), demonstrates the need for implementation of approaches not currently being commonly applied in practice in determining levels of risk adjustments. Although significant developmental work is now being conducted in this area, for example, by the IAA and within the context of Solvency II, more work on methodologies and calibration will be needed. In addition, a simplistic approach was taken in the methods used for subsequent measurement, that is, in determining the amount of risk adjustment released every year. These and other issues regarding measurement need to be addressed.

2. *The ED proposal.* The ED proposal is either not specific enough for consistent implementation or is purposefully incomplete (see Section 1.4 for a further discussion of some of these areas). For example, the ED proposal does not include extensive guidance in the areas of universal life, unbundling and liquidity adjustments. Depending on the structure of the final standard, different methods may have to be used in measuring their effects.

3. *Experience gathering.* Given the sensitivity in measurement of slight differences in certain assumptions, many insurers will have to revise their experience-gathering efforts. Although adequate for current purposes, these may not be sufficient in the implementation of a final financial reporting standard, including provision for possible scenarios outside the normal bounds of expectation (e.g., calamity scenarios). .

4. *Disclosures.* Although certain sensitivities were developed, further work may be needed to provide a meaningful set of disclosures, including reconciliations and uncertainty analyses. Depending on the requirements of either the final standard or best practice as it evolves, significant additional effort will be necessary.

5. *Education.* The members of the ATFs, although most did not have extensive knowledge or experience regarding the intricacies of the ED prior to this project, are all associated with relatively large insurers, accounting firms or consulting firms. Many other actuaries and accountants have not yet been exposed to the concepts that will be involved in future accounting standards, which in many cases are more

refined and different in comparison to a great deal of current practice. A considerable educational effort will be involved no matter the nature of the final standard.

6. *Small companies, simple products, and undeveloped markets.* Questions relating to how the large majority of smaller companies with a relative lack of skilled and experienced staff in this area will apply the new requirements remain open. The need for simplified, yet adequate approaches should be further explored.

7. *Actuarial standards of practice.* Although best practices in this area will certainly evolve, it may be helpful if educational resources or guidance on either an international level or at least not inconsistent on national levels will be desirable for implementation of the ultimate financial reporting standard for insurance contracts.

In summary, a new international financial reporting standard will likely require significant education, resources, and effort both to implement new or significantly revised valuation systems and to embed them into insurers' operations, as well as in audit procedures and user knowledge.

6. Recommended Areas for Future Research

Based on the results shown above and the challenges encountered in the modelling process, the following are seen to be areas in which future research would benefit the process of implementing the proposals in the ED.

6.1 Expected Cash Flows

Although not a requirement, as indicated in B39, it may not be practical to identify all possible scenarios and sophisticated stochastic modelling may not add significant precision, Nevertheless, it may be appropriate to continue to enhance the literature and actuarial methods (for example, more extensive use of stochastic modelling described in the IAA's book *Stochastic Modelling: Theory and Reality from an Actuarial Perspective* (2010)) that may be used to estimate the amount and timing of the cash flows of insurance contracts.

6.2 Discounting

An approach that can be used to derive the present value of cash flows when applying stochastic modelling methods is to discount at scenario-dependent rates. Methods used for this purpose may require future development and dissemination.

Discounting cash flows for products where the underlying cash flows are dependent on investment performance either directly or indirectly, such as universal life, participating whole life, and certain annuities, may need further investigation. Included in possible approach are the use of discounted based on the expected earned rate, credited rate, scenario-dependent rate, or a mixed basis depending on the extent of asset dependence.

The current effort of the International Actuarial Association to develop a monograph on discount rate related issues is noted.

6.3 Risk Adjustments

In this paper we have relied primarily on a relatively simple cost of capital approach. Other approaches may be determined to be just as appropriate if not better in these or other types of situations. Further research is needed to enhance practical application of methodologies used to estimate risk adjustments, include correlation among the various assumptions inherent in the applicable methods, for example, approaches to reflect risk preferences/appetites of an insurer. In addition, appropriate approaches that may be used to estimate a risk adjustment for participating contracts and contracts with nonguaranteed elements should continue to be enhanced.

6.4 Unbundling

If the final standard includes unbundling, measurement models used for this purpose may need to be refined. In particular, the split or allocation of some of the assumptions may need to be further explored.

6.5 Product Development

The final financial reporting standard on insurance contracts may affect future product design, as well other business aspects such as business reorganizations and reinsurance. Research and development efforts, most likely conducted at the company level, will be required to determine what types of contracts and features will be offered, as well as distribution channels and their cost structures under the new accounting environment. And because it is likely that the new standard will affect in-force business, time will be of the essence to conduct these company-specific research efforts.

7. Appendices

7.1 Discount Rates

Table 7.1-1 presents the discount factors due used in the study for the time value of money that were based on prices of trades in U.S. government non-TIPs securities on December 31, 2009 that are made publicly available. Three primary sets of discount rates were used:

(1) Par Whole Life. Discount rates are based upon the insurer's expected yield rates net of expected credit risk on the assets expected to be held to support the insurance contract liabilities, based on paragraph 32 of the ED that appears to permit this.

(2) Single Premium Immediate Annuities (SPIA). Discount rates are based on the smoothed (based on five year smoothed values) rates of discount (column 4 in Table 7.1-1) plus a level annual liquidity adjustment similar to those included in the Quantitative Impact Study V (QIS 5) in preparation to implementation of Solvency II.

(3) Other products. Discount rates are based on the methodology described for SPIAs above, except that a level liquidity adjustment of 37 basis points was added, consistent with the ability of the insured to terminate them on a voluntary basis.

Table 7.1-1 Discount Rates Applied to Model Unsmoothed and Smoothed Rates, with and without a Liquidity Adjustment

	(1)	(2)	(3)	(4)
Duration of cash flows	**Observed Raw Discount Rates**	**Smoothed Discount Rates**	**Non-SPIA with Liquidity adjustments**	**SPIA With Liquidity adjustments**
1 year	99.80%	99.52%	99.15%	98.80%
2 years	99.04%	97.75%	97.03%	96.35%
3 years	96.64%	95.18%	94.15%	93.16%
4 years	93.63%	91.64%	90.33%	89.07%
5 years	89.67%	87.37%	85.82%	84.33%
6 years	85.05%	82.90%	81.14%	79.47%
7 years	80.35%	78.62%	76.68%	74.84%
8 years	75.96%	74.66%	72.56%	70.58%
9 years	71.98%	70.62%	68.40%	66.31%
10 years	67.94%	67.30%	64.95%	62.75%
11 years	64.68%	62.83%	60.43%	58.19%
12 years	60.23%	59.08%	56.63%	54.35%
13 years	56.55%	55.55%	53.06%	50.75%
14 years	53.10%	52.80%	50.25%	47.90%
15 years	50.44%	49.49%	46.94%	44.60%
16 years	47.22%	46.75%	44.18%	41.83%
17 years	44.58%	44.43%	41.85%	39.49%
18 years	42.36%	42.27%	39.68%	37.31%
19 years	40.30%	40.34%	37.73%	35.36%
20 years	38.46%	38.57%	35.95%	33.58%

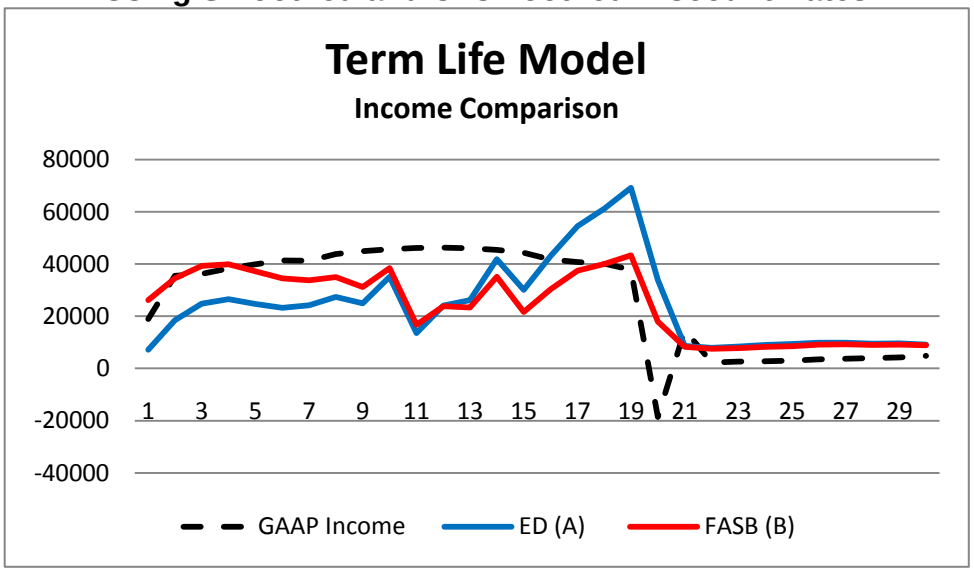
21 years	36.78%	36.81%	34.18%	31.82%
22 years	35.10%	34.97%	32.37%	30.03%
23 years	33.34%	33.32%	30.73%	28.41%
24 years	31.77%	31.84%	29.26%	26.95%
25 years	30.35%	30.50%	27.93%	25.64%
26 years	29.09%	29.31%	26.74%	24.47%
27 years	27.95%	28.24%	25.67%	23.41%
28 years	26.95%	26.73%	24.22%	22.01%
29 years	25.50%	25.58%	23.10%	20.92%
30 years	24.41%	24.13%	21.71%	19.60%

It is recognized that the approach used here to derive these liquidity adjustments will likely to be determined on a more refined basis in practice as methodologies and practice evolve in the future.

Smoothed discount rate values (based on a five year average of forward rates) were used, rather than being based on directly observed U.S. government security prices due to certain kinks in the resulting yield curve in the one year forward rates that resulted on the day selected to observe these prices. Although it has not been definitively determined, the yield curve kinks (between policy years nine through fifteen) are thought to primarily be the result of several years in which the U.S. government ran budget surpluses during the 1990's, resulting in far less available securities to be traded in applicable markets at those durations, and thus somewhat more volatile prices.

If the observed prices had been used, the discount rates given in column (1) in Table 7.1-1 would have been used, rather than those in column (2). The difference in resulting income from the use of columns (1) and (2) are shown below in Figure 7.1-1 for term insurance, corresponding to Figure 7.1-5.

Figure 7.1-1. Term Life Insurance Comparison Using Smoothed and Unsmoothed Discount Rates



7.2 Income Statement example

The simplified margin presentation of a statement of comprehensive income (income statement) as indicated in the ED for a select product is given in Table 7.2-1 for selected contract durations. The second example in the table (labelled 'adjustment example') illustrates the effect of a one time change in estimates.

Table 7.2-1 Sample Margin Presentation for LTC Insurance

Base	**Inception**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 10**
Risk Adjustment		3,028	2,322	1,938	1,508	1,157	1,172
Residual Margin		(2,817)	(6,390)	(8,617)	(12,583)	(16,340)	(11,968)
Underwriting Margin		211	(4,068)	(6,679)	(11,075)	(15,183)	(10,795)
Gain/Loss at Inception	502,177						
Experience Adjustment		0	0	0	0	0	0
Changes in Estimates		0	0	0	0	0	0
Non Incremental Acq. Costs	65,932	65,932					
Investment Income		(2,899)	(884)	2,286	5,366	8,377	22,390
Interest on Liability		(4,486)	(9,724)	(11,198)	(12,384)	(11,949)	3,188
Net interest		1,587	8,840	13,484	17,750	20,326	19,201
Income		(64,135)	4,772	6,804	6,675	5,143	8,406

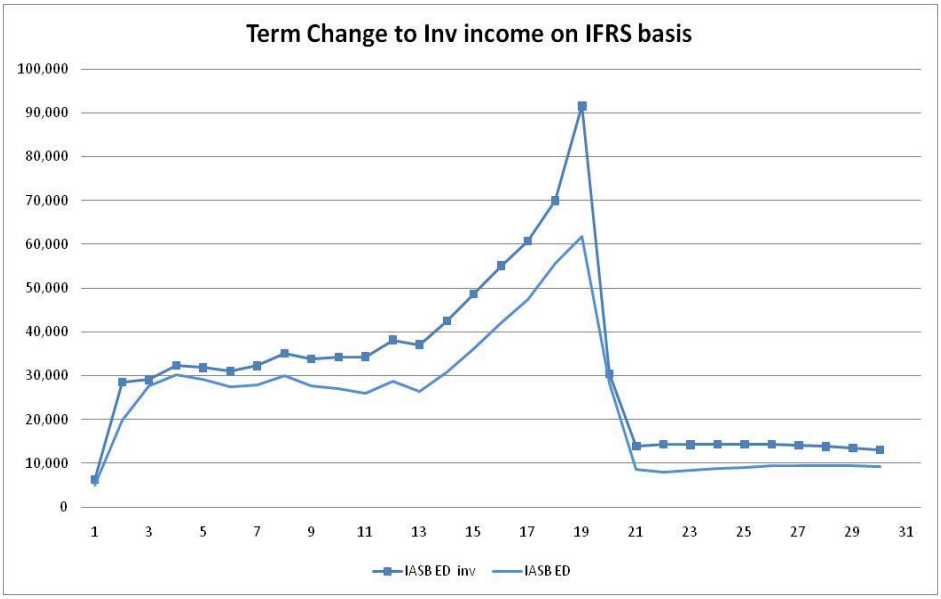
Adjustment Example							
Risk Adjustment		3,028	2,322	1,938	1,508	1,157	1,172
Residual Margin		(2,817)	(6,390)	(8,617)	(12,583)	(16,340)	(11,968)
Underwriting Margin		211	(4,068)	(6,679)	(11,075)	(15,183)	(10,795)
Gain/Loss at Inception	502,177	0	0	0	0	0	0
Experience Adjustment		0	0	0	0	0	0
Changes in Estimates		0	0	93,145	0	0	0
Non Incremental Acq. Costs		65,932	0				
Investment Income		(2,899)	(884)	2,286	5,366	8,377	22,390
Interest on Liability		(4,486)	(9,724)	(11,198)	(12,384)	(11,949)	3,188
Net interest		1,587	8,840	13,484	17,750	20,326	19,201
Income		(64,135)	4,772	99,950	6,675	5,143	8,406

7.3 Net Investment Income -- U.S. GAAP and IFRS

The convention chosen to determine net investment income is this project to enhance comparability of income between the methods was to use investment income on a net GAAP liability (net of outstanding DAC asset balance) basis. This leads to a different level of income than would occur if the investment income had been generated from the amount of IASB ED liabilities. The chart below presents the investment income comparison on the two bases. As can be seen, a significant difference can exist and can affect the ED income if looked at in isolation.

		Year 1	Year 2	Year 5	Year 10
Term	GAAP Inv Income	(11,980)	(1,868)	26,699	54,160
	IASB Inv Income	(10,683)	6,763	29,464	61,348
Par	GAAP Inv Income	(3,946,353)	603,392	14,063,406	37,620,202
	IASB Inv Income	(1,999,133)	3,038,453	22,633,692	53,812,533
LTC	GAAP Inv Income	(28,995)	(8,840)	83,766	223,898
	IASB Inv Income	15,477	55,160	181,990	387,187

A change in the basis from which investment income was derived would in turn change the amount of income shown in the figures in Section 3 according to the IASB ED and FASB DP as shown in the charts below for three selected products.



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