ASSOCIATION ACTUARIELLE INTERNATIONALE
INTERNATIONAL ACTUARIAL ASSOCIATION

Renewal Premiums and Discretionary Participation Features of a Life Insurance Contract

A Joint Research Project

August 2004

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EXECUTIVE SUMMARY

In the Report on the Joint Research Project of the ACLI/IAA to the IASB (the "Board") dated June 3, 2003 during Phase I of the insurance contracts project, we noted that a financial reporting model that is not properly constructed could result in significant volatility that does not reflect "business reality", including reported losses at issue for business otherwise expected to be (and found to be) profitable for one of the simplest life insurance contracts sold by insurers (a single premium annuity).

This Report extends that analysis to a much more complicated, and widely sold, life insurance contract, a universal life (UL) insurance contract as sold in the U.S. in 1990. Specific emphasis is placed in this Report on major policy issues that the Board left unresolved until Phase II of the insurance contracts project, namely renewal premiums and discretionary participation features. In addition, in the course of our analysis, we comment on issues involving embedded options and guarantees, future interest rate spreads, and reflect on market information.

While the life insurance industry has been in existence in the U.S. for more than a century and a half, it has been only recently that life contracts have featured flexible premiums, benefits, and other variable features. Nevertheless, the same sales process that has produced relatively high first year costs, reflecting service, insurance risk transfer and asset accumulation compensation, remains integral to the business.

This Report, not surprisingly, illustrates that an accounting model that ignores renewal premiums in its measurement of future liabilities can result in a significant loss at issue, followed by significant gains in the immediately following financial reporting periods, even when the insurer bases its prices on the expectation that those renewal premiums will be paid and the expectation is realized. Similarly, through a cohort analysis, it is shown that years of unusually high sales that are expected to be profitable can result in years of losses, while declines in the amount of profitable business sold can result in relatively increased patterns of earnings. Given that the overarching Objective of the IASB is to develop "high quality, transparent and comparable information in financial statements and other financial reporting to help participants in the various capital markets of the world and other users of the information to make economic decisions", we question whether any financial reporting standard that has these characteristics as a result of not recognizing expected renewal premiums can be said to meet the Objectives of the IASB.

Similarly, illustrated in this Report are the effects of simple discretionary participation features to show that if the measurement of the liability for an insurance contract does not take into account amounts related to the discretionary participation features that are reflected in pricing and are expected to be paid, misleading gains at issue may arise, possibly followed by periods of future losses in later years. With respect to these discretionary participation features, the principal issue that the Board should consider is whether it is appropriate not to recognize these features in all financial reporting periods.

The contract used for this Report contains three important embedded guarantees. The first, a minimum interest rate guarantee, is "in the money". The second, a maximum contract expense charge is not "in the money", but may come into the money in the future. The third, a maximum mortality charge, is not "in the money" and might be expected to go further out of the money given recent mortality trends. This Report examines one stochastic method to measure the fair value of the embedded minimum interest rate guarantee.

This Report gives a concrete example of how a life insurance contract is priced to reflect expected future interest rate spreads and how the achievement of these interest rate spreads can be expected to lead to discretionary participation payments to the policyholder by the insurer. Just as the Report concludes that the discretionary participation features should be recognized in the

measurement of the insurance contract, it also demonstrates how the lack of recognition of the source of the earnings that justify the actual payment of the discretionary performance payments could lead to financial statements that are less than relevant.

The methods and assumptions used in modeling the prototype contract are viewed by the authors of the Report as broadly representative of those used in the marketplace to price contracts at issue and to measure the value of the contracts after issue when blocks of business, or companies, are acquired. This Report shows that apparently minor/insignificant changes in the liability measurement basis that ignore these market factors may cause significant changes in earnings, in some cases unrelated to business reality. While a certain amount of earnings volatility is to be expected by an insurance entity, it is questionable whether an accounting model should be adopted that exacerbates or creates unwarranted volatility that does not reflect "business reality" by not using assumptions that reflect information about current market practices.

Finally, recognizing that the Board has other projects on its agenda that will affect the insurance industry, e.g., Revenue Recognition and Financial Reporting, this Report also includes additional information in its Appendices that are relevant to those projects.

INTRODUCTION

This Report provides the findings of a joint research project of the American Council of Life Insurers (ACLI) and the International Actuarial Association (IAA) regarding the effects of alternative approaches that could be considered in the measurement of renewal premiums and discretionary participation features of a life insurance contract.

The analysis is based upon a typical U.S. UL contract issued in 1990 and takes into account actual historical interest rate environment since that time. While this analysis is based on a typical UL contract under actual conditions, the IASB may wish to examine other scenarios and products as part of their deliberative process.

Both graphic presentations and corresponding financial reports are shown under three liability methodologies: 1. Fair Value measurement similar to that defined in the IASB's Draft Statement of Principles regarding insurance contracts, 2. Held-to-Maturity (HTM) measurement derived from the ACLI proposal from late 2002, and 3. U.S. GAAP. The objective of the research is to illustrate in sufficient detail their financial effect to facilitate discussion of these measurement methods and their characteristics.

The ACLI is the principal trade association of life insurance companies in the U.S., and its 368 members represent, in the aggregate, 71 percent of the assets of all domestic life insurers in the U.S.

The IAA represents the international actuarial profession. Its fifty full member actuarial associations represent more than 95% of all actuaries practicing around the world. The IAA promotes high standards of actuarial professionalism across the globe and serves as the voice of the actuarial profession when dealing with other international bodies on matters falling within or likely to have an impact upon the areas of expertise of actuaries.

This project was conducted by one of the members of the Insurance Accounting Committee of the International Actuarial Association. It was reviewed by the Chairman and two vice-Chairman of the IAA's Committee on Insurance Accounting. The Chairman of the ACLI Accounting Committee, along with a small group of American actuaries and accountants designated by the ACLI, also reviewed the Report. The working group participants are listed in Appendix 5.

Before publication, the research was made available to all of the members of the drafting group of the Actuarial Standards Subcommittee of the IAA. Although this was reviewed by certain members of the IAA active in its consideration of IASB insurance accounting and related actuarial standards issues, this review does not constitute the necessary due process for this Report to be considered a public statement of the IAA, which generally can be made only after a due process involving a formal vote of the members of the IAA. Therefore, all statements in this Report concerning any opinions of the IAA should be read only as the opinions of those members of the IAA committee who have participated in preparing this Report.

Similarly, this Report had also not completed the process required for it to be considered an official public statement of the ACLI.

PURPOSES OF THE JOINT RESEARCH PROJECT

The IASB's Insurance Contracts project is important both to the insurance industry and to actuaries. A thorough analysis and understanding of its potential implications requires that the interaction of various elements of an insurance contract be examined in establishing the measurement basis for insurance contracts. Both the diversity of current national standards for insurance and the objective of the IASB to adopt a single financial reporting standard for all insurance contracts make this an important endeavor.

The specific purposes of this project include the following:

1. To enhance understanding of the effects of the measurement criteria for insurance contracts under:

- The most recent IASB proposals for insurance contracts based on fair value concepts;

- The HTM approach proposed to the IASB in late 2002 based upon concepts presented in Appendix 1; and

- Current national GAAP for insurers, using U.S. GAAP as an example.

2. To provide an educational tool for the IASB, for the insurance industry, and for the actuarial and auditing professions to better understand the practical issues that need to be addressed in the course of Phase II of the insurance contracts project.

BACKGROUND

Contract and timeframe illustrated

Insurance contracts with flexible premium payments and discretionary participation features are available in many countries throughout the world. For purposes of this Joint Research Project, we focus on a generic UL contract both because the flexibility of premiums and the discretionary participation features are significant parts of the contract, and because a large amount of business is both written each year and in force in the U.S. on such contracts.

This UL contract is structured much like a combination of term life insurance with an interest-bearing deposit account bundled into a single contract. The principal features include:

- Premiums, in any amount and at any time, are paid into the deposit account, which is credited with interest.
- The amount of the term life insurance component is equal to a total death benefit amount stated in the contract, less the balance in the account. Upon death, the account balance is paid to the beneficiary along with the proceeds of the term life insurance, so the total death proceeds are equal to the death benefit amount stated in the contract.
- The contract can be terminated by the policyholder at any time, subject to a surrender charge during the initial ten years.
- The cost of the term life insurance component depends on the account balance and is periodically deducted from the account, as are certain expense charges.
- The life insurance remains in force as long as the account balance remains positive.

Certain guarantees are embedded into the UL contract. The rate of interest credited to the deposit account cannot fall below a minimum guaranteed rate of interest. The charges for insurance and expenses cannot be greater than the maximums guaranteed in the contract.

Since there is no direct connection in the contract between the value of the deposit account and any specific invested assets, the rate of interest credited to the account is completely at the discretion of the insurer according to its discretionary participation policy. It is however subject to the minimum guaranteed rate of interest, as well as other constraints, such as the desire to remain competitive in the insurers market.

As mentioned earlier, the UL contract provides a useful case study for issues surrounding renewal premiums and discretionary elements because:

- **Renewal premiums are completely flexible** and are paid at the option of the policyholder. Nevertheless, insurers have considerable statistical information about the renewal premium patterns for the contract under changing external financial environments. If future death benefit and surrender cash flows must be estimated for purposes of liability valuation and if these future benefit patterns reflect future renewal premium actions by policyholders, how, if at all, should the future premiums be recognized?
- **Discretionary elements are typically not constrained** or restricted by any formula in the contract or other legal requirement other than the rate of interest credited to the account is in excess of the minimum guarantee, and the charges for term insurance costs and other expenses are less than the maximum guaranteed. These differences between guarantees and current discretionary practices affect the future cash flows and may need to be estimated for purposes of liability valuation. Should they be estimated, or should future cash flows be projected on the basis of contractual guarantees alone for accounting purposes? If contractual guaranteed terms alone are used, interest expected to be credited to the policyholder's account will be underestimated and mortality and expenses charges expected to be debited from the policyholder's account will be underestimated. Both

actions would reduce the measured liability below an amount consistent with the policyholder's reasonable expectations.

Why should future cash flows be considered at all? The UL contract includes at least two valuable rights. First, it contains the right to continue paying for insurance coverage at rates agreed to at purchase even if the health risk has deteriorated considerably. This means that even if the new "market" price for life insurance purchased by a policyholder now in poor health has gone up, the policyholder can still retain life insurance at the old rates by maintaining the minimum funding requirements of the product. Second, it contains the right to continue to contribute premiums to the deposit account even when the current market rate of interest is less than guaranteed, permitting the policyholder to benefit from the minimum interest guaranteed.

Actuaries in the working group have priced a UL contract with a stated death benefit of $200,000 sold to a U.S. male age 45 as of December 31, 1990. The contract terms reflect then-current industry practices concerning guarantees, and the illustrated commissions, investment returns, mortality charges and other contract features reflect market conditions of that time. The contract was priced to obtain a target return on equity capital.

This contract is illustrated as having been exposed to the fluctuations in interest rates that occurred since 1990 in order to show the accounting results that might be obtained under actual conditions. Some illustrations are also shown based on no fluctuations in interest rates in order to show differences in earnings emergence that can occur purely based on the accounting measurement criteria, independent of changes in the financial environment.

The end of 1990 was chosen as the issue date for these illustrations partly because interest rates have declined significantly since that time. It was felt that a declining interest rate environment would be useful in evaluating the ability of measurement criteria to produce appropriate liability levels and earnings that reflect economic reality as external financial conditions change.

As a result of the declining interest rates during the first ten years, the amount accumulated in the deposit fund after ten years is less than anticipated when the contract was issued, and less than necessary to keep the contract in force for the long term if the original "target premium" assumptions were continued. Industry experience indicates that policyholders will increase their renewal premium payments in order to maintain their valuable insurance and minimum deposit interest rights. For purposes of these illustrations, we assume that the policyowner wishes to keep the UL contract in force and increases the renewal premium payments from duration ten. Therefore, after the tenth year, an increase in the rate of premium payments into the deposit fund is illustrated sufficient to provide funds to maintain the contract in force under the changed financial conditions. In practice, policyholders are continually modifying their behavior to reflect changing circumstances. In this Report, we examine one plausible change by one policyholder to examine the accounting effects.

For purposes of the illustrations in this Joint Research Project, all available cash flows were treated as being invested in fixed income securities. For simplicity, only coupon-paying publicly traded corporate bonds were used.

Appendix 1A and 1B shows the full details of the product pricing and other model assumptions, including the profit objective, which is in the form currently used to provide results consistent over time. A great many variations of this generic UL contract have been developed and sold throughout the world. The modeling of such variations is beyond the scope of this Report. However, we focus here on the simple, generic version of universal life just described.

Liability measurement bases

Illustrations are shown in this Report based on a fair value accounting system, where assets are measured at market value and liabilities are measured at fair value, are based upon measurement criteria contained in Appendix 1C. The ACLI has proposed that the IASB consider an alternative insurance liability accounting standard that is based on a HTM concept, consistent with the amortized cost measurement basis for assets of the same name. Illustrations with assets measured at amortized cost and liabilities measured consistently on the HTM basis are also shown in Appendix 1.

The UL contract has two components for which a fair value can be measured separately; the minimum interest rate guarantee and the contract without this guarantee. For the purpose of this Report, the minimum interest rate guarantee is measured on a stochastic basis. The contract without the guarantee is measured on a deterministic basis. While it might be argued that the fair value of the host contract cannot be measured on a deterministic basis, it is felt that this two phase approach does capture the fair value of the bundled contract.

At issuance of the contracts, the liabilities were measured using a single discount rate that approximately reflected "A" quality current corporate rates, reduced for the cost of expected defaults and asset administration expenses. The "A" rate was used because it is representative of the level of risk that the life insurance industry was willing to accept during most of the period in question and hence closely reflected market reality. In addition, the discretionary participation interest rate payments observed in the marketplace reflected insurers' realized investment returns after investment expenses and defaults. In measuring life insurance liabilities, each expected payment was increased by adding a margin such that the "profit at issue should be zero," even though the industry expected to (and generally did) make a profit on these products. This was to reflect an earlier Board decision to that effect.

This fair value liability calculation basis closely reflects actual market conditions. The working group recognizes that the yield curve to be used for discounting future cash flows in insurance liability calculations is controversial and that some feel that risk-free, or government, rates should be the reference yield curve. Illustrations using risk-free rates have not been included in this paper because the use of such rates would be inconsistent with the assumed discretionary participation payments that would be made by insurers in response to their policyholders' reasonable expectations. Our 2003 Joint Research Project Report contains a discussion of the risk-free and alternative rates methods.

In contrast, using risk free rates would result in significant losses at issue on products with a savings element and where profits were anticipated at issue (and obtained in reality) unless negative market value margins (MVMs) were allowed to produce a zero profit at issue or unless interest payments on accumulation accounts that were much lower than reasonably expected were assumed. The working group feels that it is inappropriate for an accounting standard to recognize a "required" loss at issue on business expected to be profitable. We also believe that the negative MVM required in this case to bring about an initial breakeven condition would be very difficult for any but the most sophisticated users of financial reports to understand. Therefore, it was decided that for the purpose of this paper, the best way to reflect fair value with this objective in mind is to determine liabilities values using a discount rate consistent with the quality of securities from which participants in the marketplace derive market prices and make discretionary participation payments that reflect a reasonable liquidity premium. We believe such use of direct market information is consistent with (and required by) the underlying objectives of a fair valuation method.

For simplicity of illustration, the yield spread between corporate bonds and risk-free assets was assumed to remain constant throughout time. This assumption is not consistent with values derived

from the financial markets. In practice, actual market yields and prices would be reflected. Nonetheless, it is felt that the use of this simplifying assumption to facilitate the calculations in this Report does not materially affect the comparisons derived in this Report.

Earnings

The earnings shown in this Report include earnings on explicit and implied capital (the statutorily required risk-based capital in the U.S.). This was accomplished by using a "profits released" model, where assets are maintained equal to the liability required by U.S. Statutory accounting. Assets accumulated in excess of those needed to support the statutory liability and minimum related capital are assumed to be distributed to shareholders at that time.

We chose this measurement of earnings to reflect how insurers are managed. Insurers have assets to support not only their statutory liabilities and minimum risk based capital, but also a level of risk based capital consistent with the insurers' equity needed to maintain their desired ratings level. Contracts are priced to meet these objectives. Just as financial reports do not bifurcate earnings between those arising from statutory liabilities and those arising from equity (including required risk based capital), our earnings illustrations do not make any such bifurcation.

The illustrated financial reporting methods force a zero profit at issue by setting the MVMs at a level such that the present value of expected contract cash flows plus the present value of MVMs equals the expected net product cash flow at issue. Thus, a provision for the cost of implied capital embedded in the premium is implicitly accounted for in the initial liability. However, in subsequent periods assets are maintained equal to statutory liabilities plus the related capital as indicated above. Thus, if actual experience is as anticipated when the contract is priced, the inherent profit from achieving the desired return on capital that is not allowed to emerge as "profit at issue" gradually emerges into earnings over time as the company is released from risk.

CONSIDERATION OF RECOGNITION OF RENEWAL PREMIUMS ON LONG-TERM PRODUCTS

In the Basis for Conclusions of IFRS 4, *Insurance Contracts*, the IASB's tentative position on recognition of renewal premiums in calculating liabilities for Phase II is stated as follows:

"**BC 6.d.** The measurement of contractual rights and obligations associated with the closed book of insurance contracts should include future premiums specified in the contracts (and claims, benefits, expenses, and other additional cash flows resulting from those premiums) if, and only if:

1. policyholders hold uncancellable continuation or renewal rights that significantly constrain the contract issuer's ability to reprice the contract to rates that would apply for new policyholders who have similar characteristics to the existing policyholder; and
2. those rights will lapse if the policyholders stop paying premiums."

In many accounting systems, liabilities for traditional life insurance contracts equal the present value for future benefits and expenses, less the present value of future expected premiums. In some, including U.S. GAAP, the amount of future premiums is adjusted to exclude the portion associated with profit. In our fair value illustration below, the amount of future benefit payments is adjusted to exclude any emerging profit at issue. Under U.S. Statutory accounting, only the expected net premiums (i.e., premiums excluding loads for expenses and profits) under restricted assumptions are included. Nevertheless, it is a long-standing principle that the present value of such premiums should be recognized.

While there is general agreement in the actuarial profession that the value of renewal premiums should be recognized in liability calculations, it is far from clear how this principle should be applied in all situations. Our research was therefore designed to show the implications of how this rule might be applied in practice.

Observation: *For traditional fixed premium life insurance products, we believe it is reasonably clear how to apply this principle. In these contracts, as long as the premiums are paid, the insurer cannot change the premiums or premium charges from those agreed upon at issue. Furthermore, the contract cannot be terminated if the premium is paid as agreed, regardless of the health of the insured. The expected fixed renewal premiums for these products should be recognized, since not paying them results in the contract terminating or being required to switch to a reduced level of benefits through a non-forfeiture option. The same is true for contracts whose automatic non-forfeiture options is an automatic premium loan since these loans, if continued, can also lead to loss of coverage. In any case, the policyholders can lose cancellation or renewal rights that can be valuable to them when premiums are not paid.*

For many universal life type products, the use of such an approach would be potentially more complex since there is no fixed premium schedule and the contract does not immediately lapse if a premium is not paid, unless there is no remaining account value. Furthermore, the insurer often has the right (as illustrated in our contract) to increase certain charges within limits specified in the contract (Cost of Insurance (COI) charges and expense charges) to reflect the overall experience on the group.

In order to gain further insight into the issues involved in determining an appropriate liability for a universal life product, we modeled a variety of possible recognition patterns for future renewal premiums. Three such patterns illustrate a range of possible approaches:

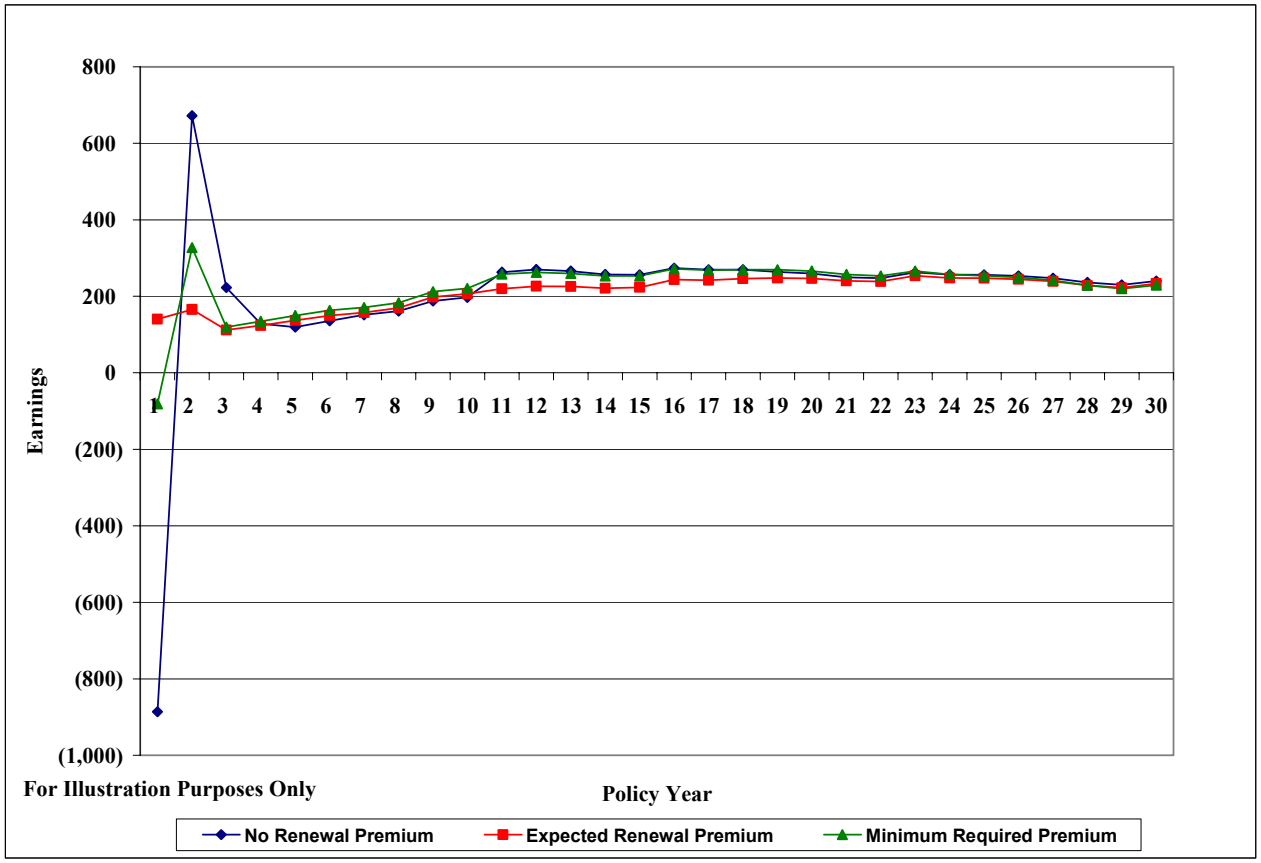
1. No future renewal premiums are included in the liability calculation
2. All expected future renewal premiums are included
3. Only the minimum renewal premiums required to keep the contract in force are included

In each case, we assume that both assets and liabilities are measured at fair value.[1] For the liabilities, a margin for risk and uncertainty is set so that there is no gain at issue using pricing assumptions (see Appendix 1) for our best estimate of future experience. As this margin is calibrated to the market price agreed to by the contract purchaser, we refer to it as a market value margin (MVM). The calibration of the margin used here is not the only acceptable method. Other methods could be used in practice.

The results of these different assumptions are shown in the charts below. Chart 1a shows how earnings would emerge had the yield curve on December 31, 1990 remained constant. Chart 1b shows earnings emergence in the actual dynamic financial environment characterized by the 1990 thru 2003 time period.

From Charts 1a and 1b, it can be seen that a decision not to recognize any renewal premiums for the universal life product would lead to large losses in the first year followed by largely offsetting gains in the following two years. This reflects the incidence of both costs of acquisition and early high rates of commission.

Chart 1a: Earnings impact of renewal premium assumptions
1990 yield curve remains unchanged

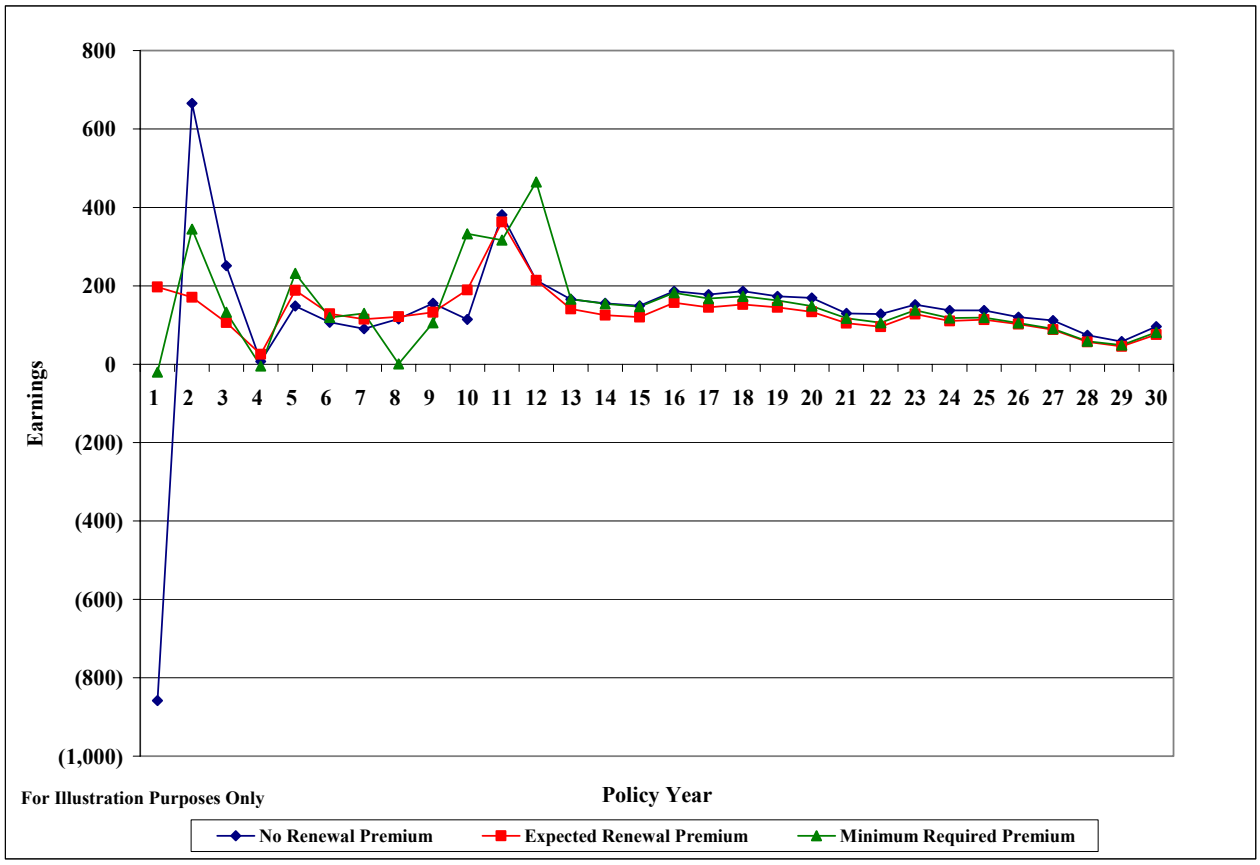


As can be seen from the chart above, if interest rates had remained unchanged after 1990 and the contract liability had been measured recognizing the premiums that the policyholder was expected

[1] If both were measured on a HTM basis, the results would be essentially the same.

to pay after the "no profit at issue" criterion had been imposed, the earnings in the 30 years illustrated would have been stable (and slightly increasing) as the market value margins that suppressed the profit at issue were released into earnings. However, if no renewal premiums were recognized, the pattern of earnings would have been a large loss at issue followed by largely offsetting gains in the following two years, before earnings tracked those that arise if all expected premiums were recognized. As would be expected, if only the minimum renewal premiums necessary to preserve the contract in-force were recognized, the pattern of earnings would be to have a modest loss in the first year that is largely offset by a somewhat larger profit in the following year, before earnings track those that arise when all expected future renewal premiums are recognized.

Chart 1b: Earnings impact of renewal premium assumption
1990-2003 yield curve



Observation: *From Chart 1b, it can be seen that, under the actual financial environment experienced following 1990, a first year loss followed by gains in the next two years would also have been reported if financial reports are prepared without recognizing expected future renewal premiums in the liability measurement. Such earnings of the insurer may not reflect the fair value financial results. The working group feels that a meaningful accounting standard should avoid what is in effect a "required" loss at issue on business expected to be profitable. A user of financial statements would expect that when an entity sells what the insurer considers to be profitable business, the entity's earnings should increase, or at a minimum not decrease. Once again, recognizing the minimum premium required to keep the contract in force reduces the distortion but does not eliminate it.*

The recognition of expected renewal premiums is consistent with the way the product is priced and also consistent with the way that block acquisitions (the closest thing there is to a real market value) are priced.

We also looked at what effect not reflecting renewal premiums would have on an insurer's reported results of several years of sales. Chart 2a shows the results assuming level annual sales with a static yield curve and Chart 2b shows the alternative results with the actual historical (changing) yield curve.

Chart 2a – Earnings impact of renewal premium assumption – cohort analysis ten years of level sales – static 1990 yield curve

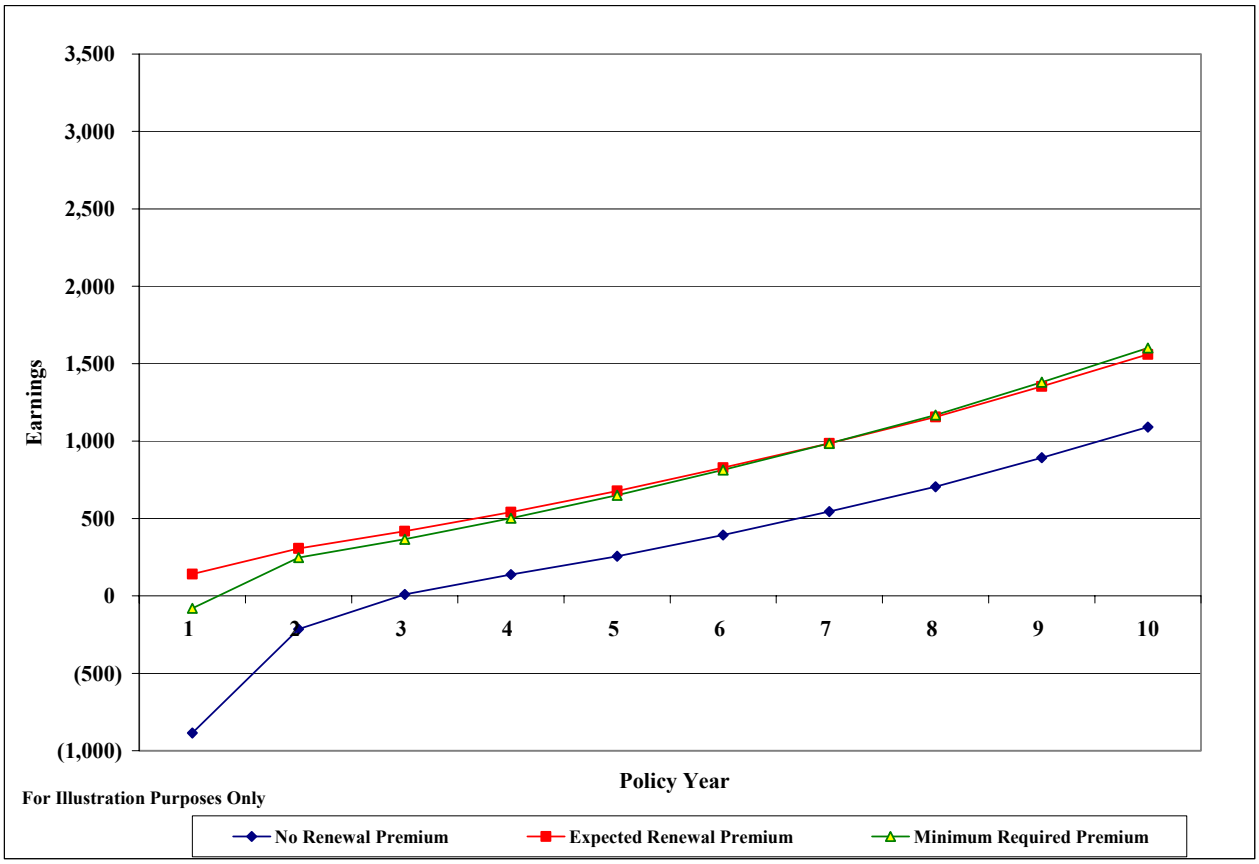
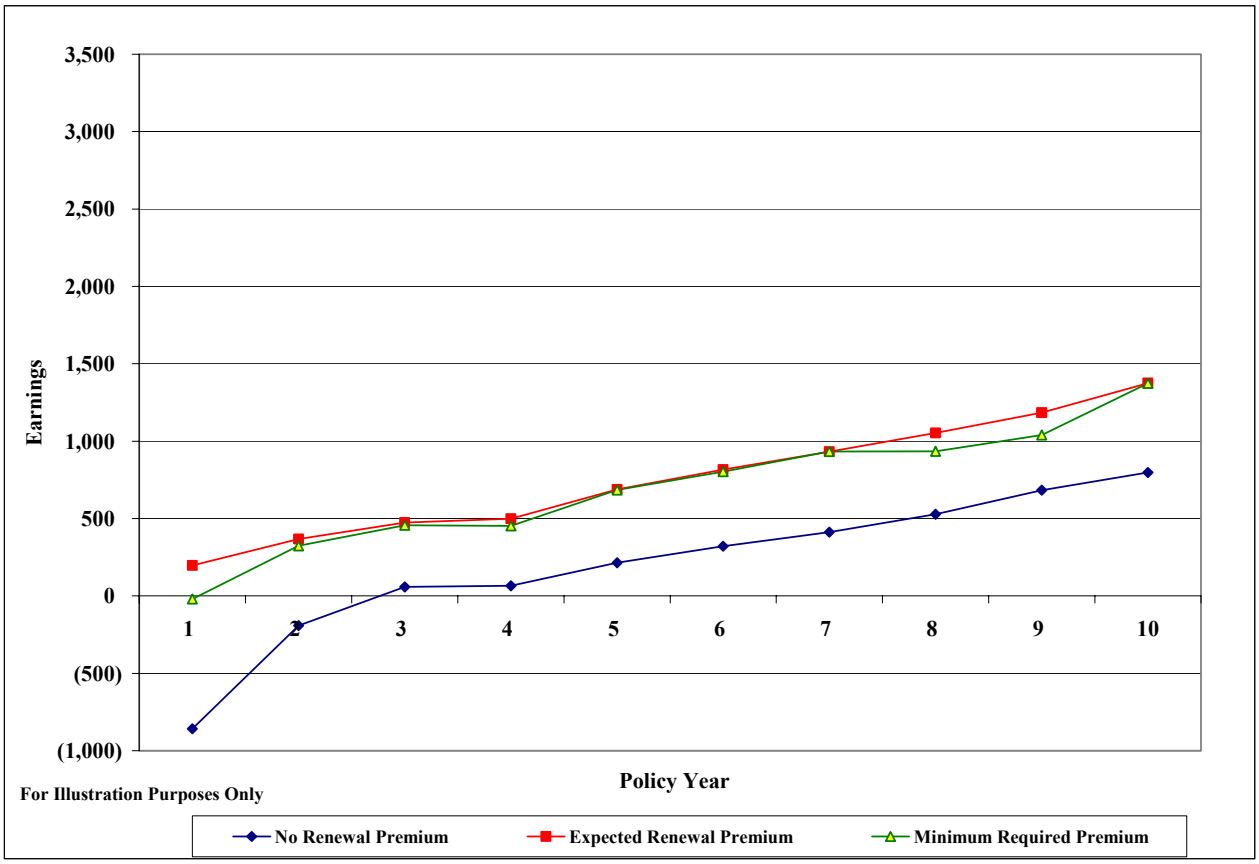


Chart 2b: Earnings impact of renewal premium assumption – cohort analysis ten years of level sales – dynamic yield curve 1990-2003



Observation: *From Chart 2b, we see that not recognizing expected renewal premium reduces the earnings of the insurer for the entire ten-year projection period and results in years of actual losses. Therefore, without renewal premiums recognized, an insurer that sells more of a properly priced product than another insurer would show lower earnings and equity, a result that is contrary to the real economic situation of the two insurers.*

In Chart 2c, we also illustrated results assuming there was a one-time 50% increase in sales in the third year, with sales returning to the previous level thereafter, using actual historical interest rates. Chart 2d shows results when there is a one-time 50% decrease in sales in year three.

Chart 2c: Earnings impact of renewal premium assumption – cohort analysis
ten years of level sales with 50% increase in year 3
1990-2003 yield curve

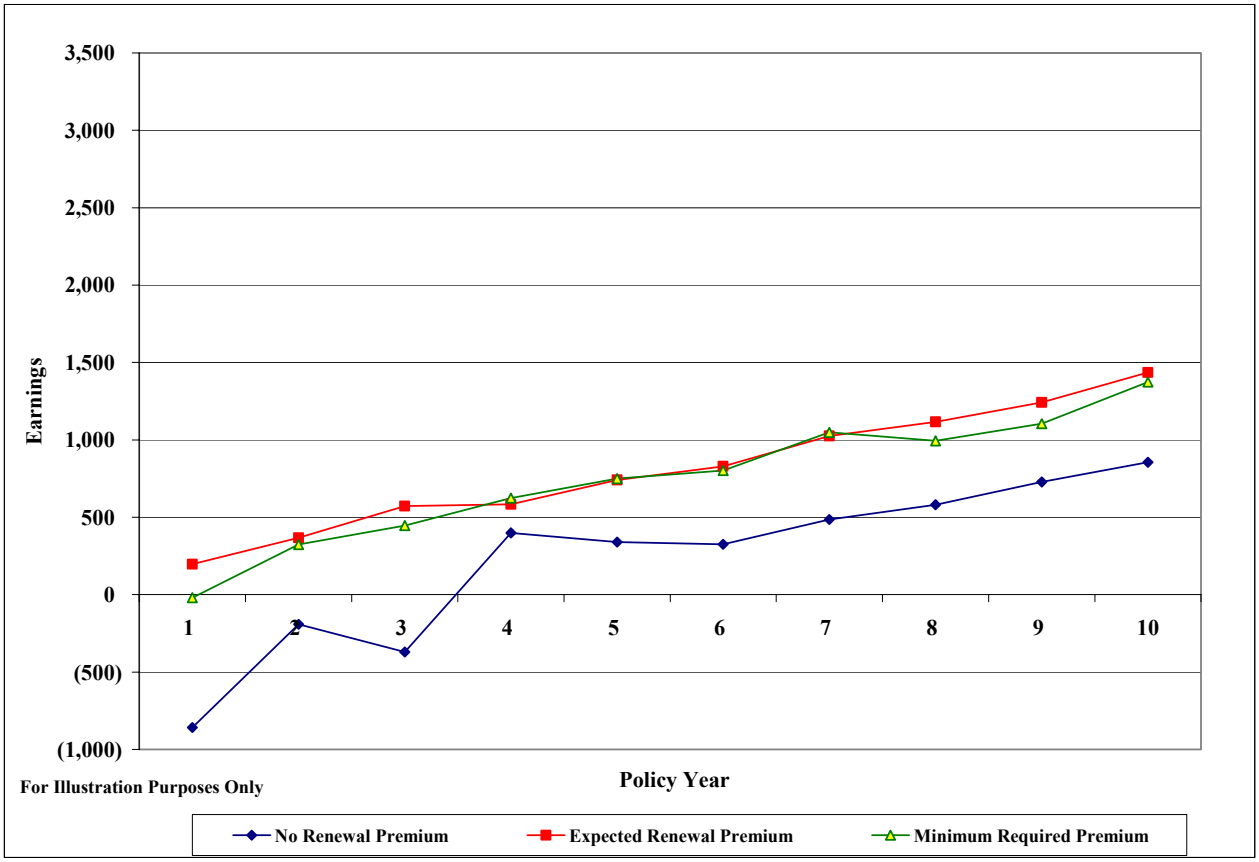
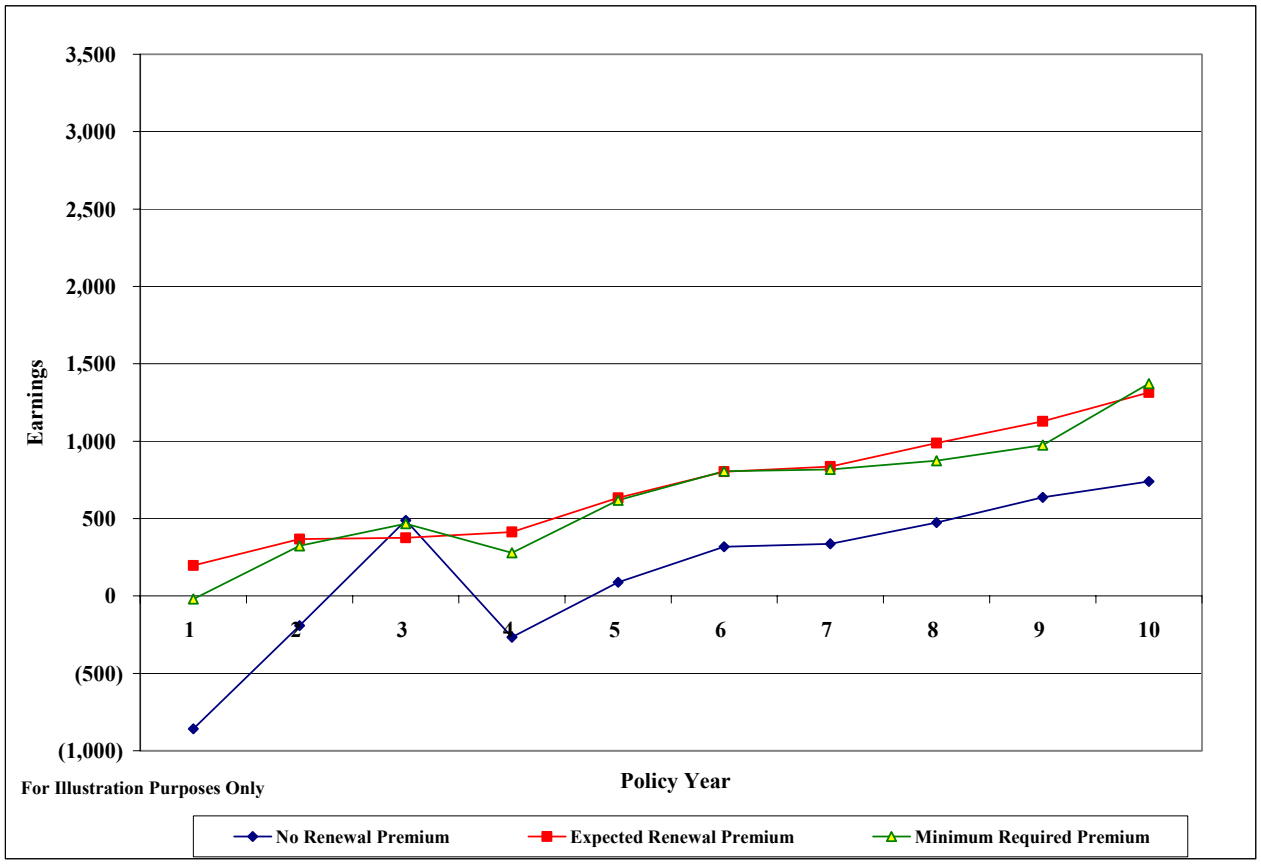


Chart 2d: Earnings impact of renewal premium assumption – cohort analysis
ten years of level sales with 50% decrease in year 3
1990—2003 yield curve



Observation: *Counter-intuitive results are illustrated in Charts 2c and 2d when no renewal premiums are recognized. When more business that is expected to be profitable is sold, reported earnings decline. When less of the same business is sold, reported earnings increase. The reported financial results are not relevant to the economic circumstances of the insurer.*

Observation: *Although we did not model products other than universal life, similar results that lack relevance should be expected to arise from such products as non-cancellable and guaranteed renewal health insurance products. These non-cancellable contracts are similar to traditional life insurance contracts in that their premiums cannot be changed at any time. Although the premium for the guaranteed renewal contracts can change, the contract cannot be cancelled, even for individuals whose medical condition has significantly deteriorated since the contract was issued.*

Observation: *The assumption concerning recognizing the expected amount of future renewal premiums should be reviewed at the same frequency as other contract assumptions, whether using a fair value basis or an HTM basis. In future years, expected renewal premiums should continue to be recognized even if, at some point, the cash value of the contract is sufficient to keep it in force without any further premium payments. This would typically happen in a contract with significant discretionary participation features where future policy benefits would reflect the actual premiums paid.*

DISCRETIONARY PARTICIPATION FEATURES

Many insurance contracts provide for payments in excess of guaranteed minimum insurance benefits. These payments can take many forms, such as cash dividends, additional paid-up insurance, additional one-year term insurance, etc. These discretionary participation features (using the IASB's terminology) are often termed non-guaranteed elements rather than non-guaranteed payments. Whatever their name, accounting issues arise because such payments are not guaranteed. In particular, these accounting issues include recognition, measurement, and disclosure issues, such as:

- Recognition: Should non-guaranteed elements be recognized for purposes of liability valuation?
- Measurement: If the elements are not guaranteed and are discretionary, how should their value be measured?
- Disclosure: Should the liability value of guaranteed elements be disclosed separately from non-guaranteed elements? Should the value associated with future discretionary features be a liability or equity?

This section first provides a description and examples of non-guaranteed elements, and then discusses each of the issues noted above in the context of illustrative financial statements for a UL contract.

Description and examples of non-guaranteed elements

Non-guaranteed elements were developed as a means to manage risks to the insurer and to reduce expected costs for the insured. This is done by reducing the overall risk charges assessed by the insurer reflecting the reduction in risk arising from the non-guaranteed provisions.

The risk to an insurer writing an insurance contract is that the premium payments, charges and associated investment returns will be insufficient to provide the guaranteed benefits. This risk can be reduced by charging higher premiums or fees, followed by providing the non-guaranteed return to the policyholder of some portion of the profits generated, if any.

The reduction of risk to the insurer leads to a lower net cost (after non-guaranteed payments) to the policyholder, because the insurer needs to retain a smaller risk charge for taking a smaller risk. The difference in needed risk charge can be returned to the policyholder as a non-guaranteed payment. It is non-guaranteed because no payment would normally be made if the insurer suffered losses.

The ability to reduce risks to the insurer and reduce costs for the insured has led to wide use of non-guaranteed elements in insurance contracts. Such elements take many forms. Two examples are universal life insurance and participating life insurance in the U.S.

Universal life insurance

UL contracts offered in the U.S. are not participating, but provide non-guaranteed payments in other forms. A UL contract generally specifies a guaranteed minimum rate of interest to be paid on an accumulated fund, and maximum charges for expenses and mortality costs that are periodically deducted from the fund. However, in practice, the rate of interest credited to the fund is often higher than the minimum guaranteed rate, while the charges for mortality and expenses are less than the maximum charges guaranteed in the contract. The differences between current and guaranteed interest crediting rates, mortality charges and expense charges represent the non-guaranteed elements of the contract.

An insurer writing UL contracts has contractual control over the extent and level of the non-guaranteed elements of its contracts. In the case of the UL contract examined here, the discretionary participation feature is not restricted by a contractual or legally provided formula. However, competitive pressures exert a strong influence. If an insurer does not keep its interest rates and charges competitive, insurable policyholders may terminate their contracts and change insurers. The insurer's discretionary benefits practices can also provide relevant guidance that can be used to estimate future non-guaranteed elements for measurement purposes.

In a UL contract, non-guaranteed elements also play a role in determining the premium level required to keep the contract in force until death or maturity. At issue, premiums are often paid at a "target" level that will keep the contract in force if non-guaranteed elements continue at the level in effect at that time. If non-guaranteed elements decline thereafter, perhaps due to a decline in interest rates, then premium payments must increase to keep the contract in force (and conversely, if interest rates increase then premium payments may not need to be as high as originally expected to achieve the same objective). For the illustrations in this section, we show the results for a contract issued in 1990 when interest rates were much higher than today and assume historical interest rate changes. Premiums start at a "target" level but are assumed to be increased after ten years because interest rates fell between 1990 and 2000, driving down the credited rate and the policyholder realizes that increased renewal premiums are required to maintain desired insurance coverage. The illustrative increase in premiums is needed to keep the contract in force until death.

Participating life insurance in the U.S.

Although illustrations are not produced in this Report, it is worth noting that participating life insurance contracts in the U.S. also reduce risk by charging a higher premium and provide for the annual payment of a discretionary participating dividend based on the distributable surplus of the insurer. Each policyholder's annual dividend represents a distribution of surplus accumulated in excess of that which the insurer's Board of Directors deems necessary to retain as capital to provide for ongoing risks.

When the insurer is a mutual company, its Board of Directors has complete discretion over the aggregate amount of dividend payments each year. However, the amount of future dividends may be estimated for valuation purposes using techniques similar to those used to project other non-guaranteed payments.

Illustrated premium pattern

For the purposes of this research project we have assumed the contract owner has the desire to maintain sufficient value to mature the contract. During the illustrated time period, 1990-2003, interest rates were primarily decreasing. We have assumed that the contract owner realized in 2000 that if interest rates remained low, continued payment of the original premium would not maintain sufficient value to mature the contract. We have also assumed the contract owner increased the premium paid at that time to twice the original level starting in year 2000. This allows the policy to continue in force for many years, including years in which the guaranteed credit rate comes into the money. This is useful in evaluating the valuation of guaranteed and non-guaranteed elements.

Alternative treatments and illustrative results

Recognition

In general, an obligation should be recognized if it is likely to occur and can be measured reliably. Non-guaranteed elements in the prototypical universal life insurance contract meet both of these criteria. Non-guaranteed payments are likely to occur because they are in most cases paid on a regular basis. Furthermore, they can be reliably measured or estimated based either on the insurer's past practices with respect to these non-guaranteed elements as well as based on competitive market considerations. For example, the facts that the insurer has never levied

mortality charges as high as could be allowed in the contract and neither do its competitors are considerations that argue against recognizing the maximum mortality charges that the contract allows to be levied when the insurer measures the contract liability.

If non-guaranteed elements are not recognized for purposes of liability measurement, the result is a lower reported liability both at issue and in the early years of the contract. Without other accounting constraints, this can lead to significant reported profit early in the life of such contracts, followed by depressed profits or losses thereafter. Charts 3 and 4 below illustrate the pattern of profits produced under fair value and HTM measurement models that exclude non-guaranteed elements.

Chart 3: Earnings comparison with and without recognition of non-guaranteed benefits
fair value basis
1990 – 2003 yield curve

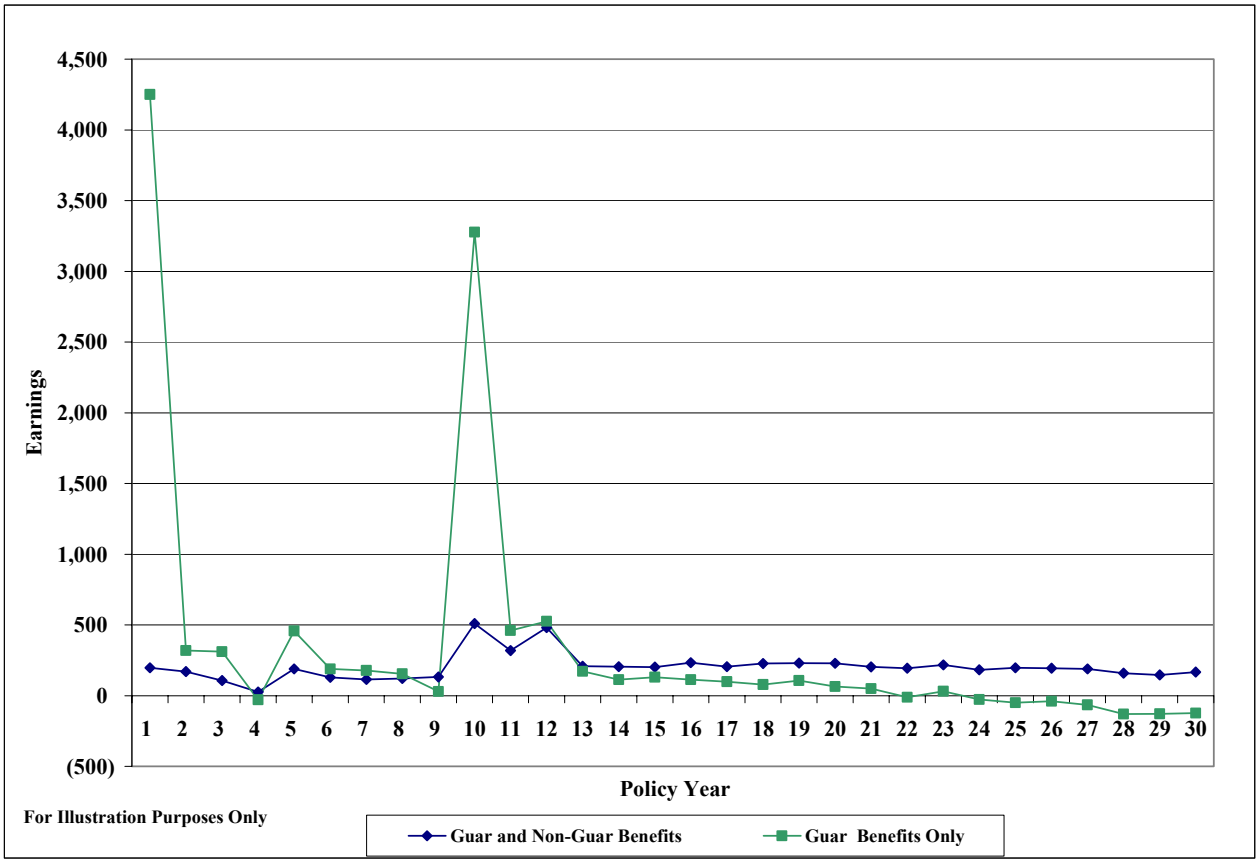
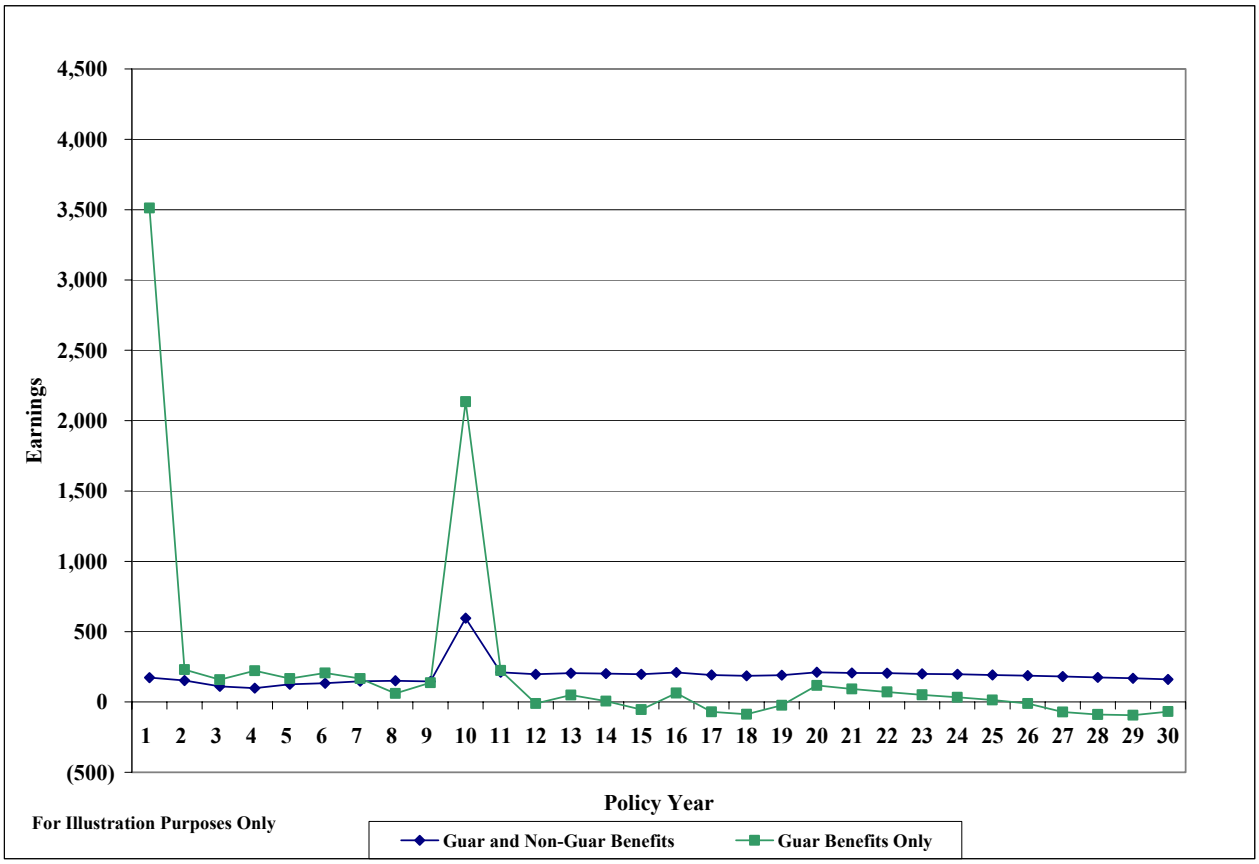


Chart 4: Earnings comparison with and without recognition of non-guaranteed benefits
HTM basis
1990-2003 yield curve



The unwarranted high level of profits in charts 3 and 4 in the first policy year and when the policyholder is assumed to elect to increase renewal premiums in duration ten that occur when non-guaranteed elements are not recognized is not relevant to the financial circumstances of the insurer. Non-guaranteed elements act in a manner similar to a hedge for the insurer, and failing to recognize them has the same effect as failing to recognize any other effective hedge. Their effectiveness is usually only constrained by the strength of the competitive market and any embedded guarantees in the contract.

The earnings spikes in years one and ten when non-guaranteed elements are not recognized arise because the present value of premiums is substantially greater than the present value of guaranteed benefits. The present value of premiums is not, however, substantially greater than the present value of expected benefits, including discretionary elements. In year one, not recognizing these discretionary elements leads to a significant gain at issue. In year ten, another significant reported profit arises when the assumption concerning the level of expected future renewal premiums is increased when future expected discretionary elements are not recognized. When the increase in premiums after year ten is viewed in isolation, the present value of the additional renewal premiums is greater than the present value of the additional guaranteed benefits. So when the additional premiums and only guaranteed benefits are recognized in measurement, the result is a reduction in the liability and a net gain on the operating statement.

The IASB project update (July 2003) for Phase II states that an insurance contract should produce no accounting profit at time of issue without regard to whether non-guaranteed elements are recognized. It is not clear how this can be accomplished when non-guaranteed elements are not recognized, because the present value of premiums is usually significantly greater than the present value of guaranteed benefits and expenses. If the constraint of no profit at issue is applied when non-guaranteed elements are required not to be recognized, MVM's that do not relate in any way to market value expectations would be required to produce a zero profit at issue. The members of the working group do not believe that the IASB would want to mandate financial statements of such little relevance in Phase II.

Measurement

If non-guaranteed elements are recognized, they must be measurable. Since the measurement basis for insurance contracts is generally the present value of future cash flows, the non-guaranteed elements must be included in the projection of cash flows used for valuation.

As was noted earlier, most insurers have established practices under which the amount of non-guaranteed payments is closely related to the experience under the contract, including investment returns, benefits, and expenses. Therefore in order to assure consistency in measurement of assets and liabilities, it is essential that the assumptions used to project non-guaranteed elements be the same as the assumptions used to project guaranteed benefits under the contract.

For example, non-guaranteed mortality charges are often set based on expected mortality rates. Therefore it is important that the level of non-guaranteed mortality charges be consistent with the assumed mortality rates used in projecting guaranteed death benefits. Likewise, non-guaranteed interest credits are often set based on earned investment returns, which depend on assumed interest rates. Therefore it is important that the level of non-guaranteed interest credits be consistent with assumed interest rate levels, including the choice of discount rate.

For example, it would be inconsistent to project non-guaranteed payments that depend on the insurer earning a return greater than the risk-free rate, and then discount these expected non-guaranteed payments at the risk-free rate to measure the contract liability.

The need for consistency between the discount rate and the projection of non-guaranteed payments results in some differences between the ways non-guaranteed amounts would be projected for liability measurement under fair value measurement methods vs. under HTM measurement methods, when non-guaranteed payments that depend on the level of investment return earned by the insurer are to be recognized.

The table below summarizes the way interest rate used for projection and discounting are determined under fair value and HTM in this Report:

	Projected crediting rate	Discount rate
Fair Value	Best-estimate projection reflecting continuation of current market conditions	Current market rates
HTM	Current level is continued indefinitely with no future change	Credited rate plus the margin locked in at time of issue or last loss recognition.

An example may help explain the table. For simplicity, we will use single interest rates to represent the full yield curve. Assume that the initial expected market rate after investment expenses and defaults was 6.5%; the initial credited rate was 6.00% resulting from an anticipated margin between credited and earned rates of 0.50%; and that market interest rates have recently declined

to a 5.00% net level. This decline in market interest rates leads to the expectation that credited rates will decline over time from the initial 6.00% to 4.50% = 5.00% · 0.50%.

Under the fair value measurement model used in this Report, cash flows are projected assuming that the crediting rate started at 6.00% and is at 4.50% now. The discount rate is now 5.0% for all future time periods (the current net market rate).

Under the HTM measurement model used in this Report, cash flows are projected assuming that the crediting rate stays at 6.00%, while the discount rate is 6.50%, equal to the initial credited rate plus the locked-in margin.

In this situation, where interest rates recently declined, one would expect the liability value to be greater under the fair value measurement basis than under the HTM measurement basis. This expectation is based on the assumption that, at least for a temporary period, the credited rate will be greater than the corresponding discount rate. However, the relationship between the credited rate and the discount rate is more important in the measurement of the liability for such a contract than the level of interest rates. This result is analogous to the measurement of fixed-coupon bonds, where the fair value depends on the relationship between the coupon rate and current market rates.

Charts 3 and 4 (shown previously) are based on the measurement techniques described here and illustrate the similarity in direction and magnitude of results under the two measurement methods depending on whether expected discretionary benefits are recognized or not. These charts show that not recognizing expected discretionary benefits produces earnings that are less than relevant under either method. The charts also show that recognizing expected discretionary benefits produces earnings that are similar.

Disclosure

IFRS 4, paragraphs 34 and 35, contain guidance for insurance contracts containing discretionary participation features, which provide for non-guaranteed benefits. Charts 5 and 6 illustrate the present value of total net cash flows under the prototype universal life contract when all benefits (both guaranteed and non-guaranteed) are considered compared to the present value of total net cash flows when just guaranteed benefits are considered. Chart 5 shows these values using a fair value measurement basis and is consistent with Chart 3, while Chart 6 shows values under an HTM measurement basis and is consistent with Chart 4. These charts demonstrate the similarity of liability measurement results under the fair value and HTM measurement bases.

Chart 5: Liability comparison - guaranteed benefits vs. non-guaranteed benefits
fair value basis
1990-2003 yield curve

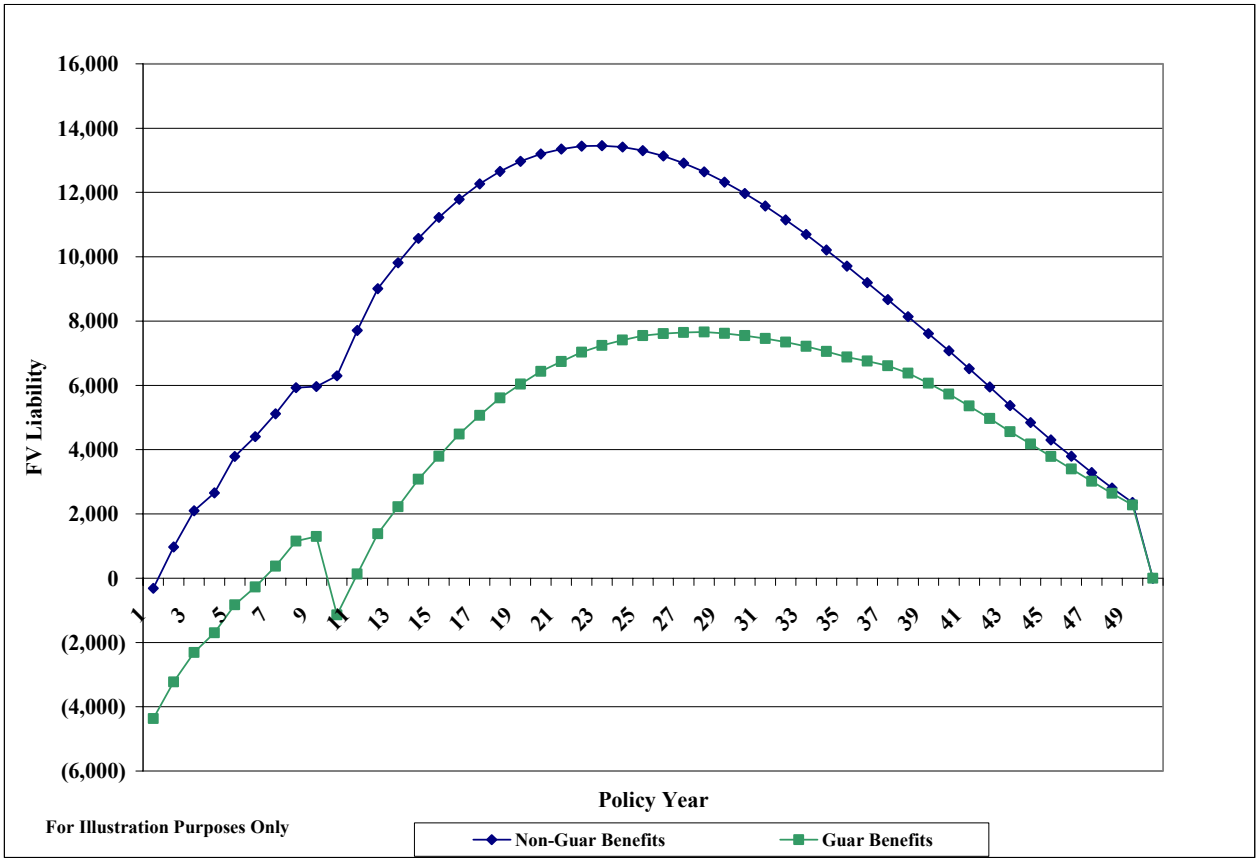
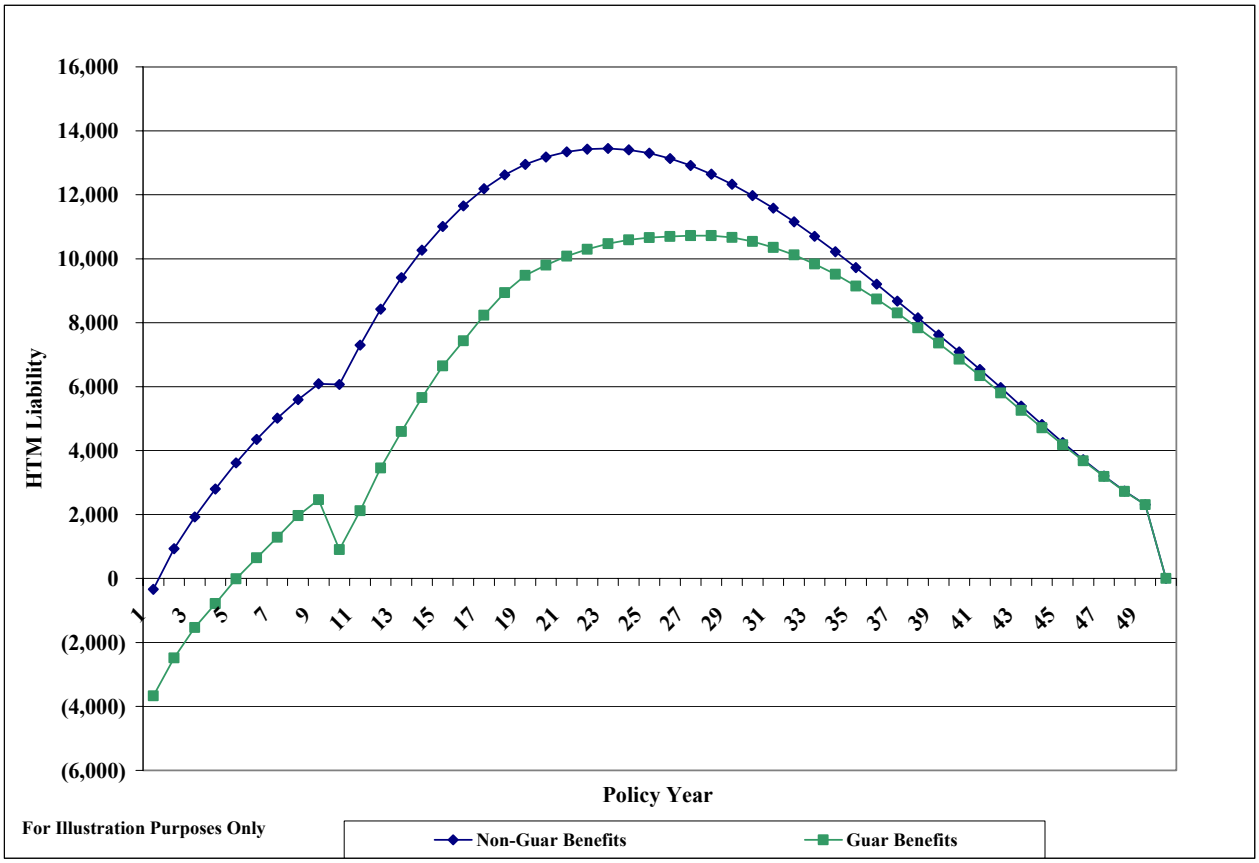


Chart 6: Liability comparison - guaranteed benefits vs. non-guaranteed benefits
HTM basis
1990-2003 yield curve



It can be seen from the charts that the liability for guaranteed benefits is subject to more variability than is the liability for total benefits, especially in year ten when renewal premium levels are assumed to change. In addition, the liability for guaranteed benefits starts out at a negative value. In some cases the liability for total benefits (including expected discretionary benefits) increases at the same time that the liability for guaranteed benefits alone decreases.

Readers of financial statements could easily find this information puzzling. How can the liability for guaranteed benefits be negative? Why does it decrease when the liability for total benefits increases? The answers to such questions would be difficult to explain to the users of financial statements. On the other hand, the liability pattern measured under either liability measurement method illustrated in this Report when expected non-guaranteed elements are recognized is relevant to the financial circumstances of the insurer and the changes are easy to explain to users.

Without a rather complex explanation that may be too technical for many users to understand, the working group feels that it may not be appropriate to require this type of disclosure in such circumstances, as it may make the financial statements more confusing, less relevant, and opaque. Because of the similarity of non-guaranteed elements to certain hedges, a requirement for disclosure of values excluding non-guaranteed elements could be viewed as being analogous to a requirement for disclosure of results excluding an effective hedge.

COMPARISON OF U.S. GAAP, HTM AND FV MEASUREMENT TECHNIQUES

As can be seen in current practice and in current discussions, there are a wide variety of methods that can be applied to the measurement of insurance contracts. The focus of this research project utilizes two approaches that we call fair value and HTM. This section compares their results to those generated under U.S. GAAP, specifically FAS No. 97, *Accounting and Reporting by Insurance Enterprises for Certain Long-Duration Contracts and for Realized Gains and Losses from the Sale of Investments,* (FAS 97), as a gauge to assess variability, complexity, reliability and relevance. As the Board deliberates the measurement objectives and criteria to be used for insurance contracts, these results may be informative.

Under FAS 97, accounting for UL contracts requires the use of a retrospective deposit method with capitalized deferred acquisition costs (DAC) amortized as a constant percentage of estimated gross profit[2]. Since it is uncertain whether Phase II of the insurance contracts project will include recognition of DAC, the analysis presented here presents the U.S. GAAP results on both a gross and net basis, i.e., reported liabilities as measured in accordance with FAS 97 with a corresponding DAC asset and on a net basis with the liabilities reduced by DAC.

A comparison of earnings and liabilities are given in Charts 7 and 8, respectively. Note that while the liabilities are not materially different under fair value, HTM, and current U.S. GAAP methods, earnings patterns can be quite volatile under all three methods reflecting the ways that changes in interest rates affect liabilities. This volatility in earnings is expected since a small change in liabilities can have a significant impact on earnings. The unique spikes in Chart 7 correspond to spikes in interest rates that otherwise generally decreased over the 1990-2003 period. For the illustrated UL product, lower credit rates generally follow from lower interest rates and, when interest rates get low enough, profit margins due to decreased interest rate spreads are reduced as the minimum interest rate guarantee comes "into the money".

The illustrated product has a guaranteed minimum-crediting rate of 4.00% and a priced-for interest spread of 1.25%. Thus, as long as the insurer earns a net investment return of 5.25% it will earn its full interest margin; the margin is squeezed if the account value is lower than what was assumed for pricing purposes.

With the 2003 yield curve, however, the insurer will only be able to earn a net investment return of 4.72% (assuming continuation of its investment policy) on new investments. If this yield curve continues unchanged into the future the insurer will not be able to earn its desired net interest rate spread.

When this expected shortfall in future earnings will be reflected in the financial statements depends on the valuation system being used. Under U.S. GAAP, this is first recognized in 2003 when the yield on new investments drops below 5.25%. Under HTM, this is recognized starting in 2008 when the actual yield on the portfolio falls below 5.25%. Under fair value, this is recognized all years after year thirteen as a result of the measurement of the interest rate guarantee through a stochastic method.

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[2] In order to amortize DAC as a constant percentage of estimated gross profit under FAS 97, an estimate of future gross profits must be made on each valuation date. As was noted in the introduction, the scenario for these illustrations involves market interest rates that generally decline during the first ten years, leading to an eventual need for the policyowner to increase premium deposits to keep the deposit account from declining to zero. The pattern of premium deposits certainly affects the estimation of future gross profits, but the future increase would not be "known" in the early years of the illustration. It was necessary to specify when the increase in futures deposits would be "known" for purposes of estimating future gross profits. We assumed it would become "known" at the end of ten years, the same point at which we assume the increased deposits to begin. All estimates of gross profits used for valuation dates in the first nine years do not reflect the future increase in premium deposits.

U.S. GAAP

The net actuarial liability under U.S. GAAP is the contract liability less the DAC asset. Under FAS 97, the contract liability is equal to the account value. The DAC asset is amortized as a level percentage of actual historical and estimated future gross profits. During any accounting period, the DAC balance increases with interest and decreases with amortization.

Estimated future gross profits are calculated on a current best estimate basis with no margin for adverse deviation. In our model, the current best estimate with regards to investment return is the continuation of the current yield curve indefinitely into the future. Continuation of the current yield curve will lead to a reduction in the future expected interest margin from 125bp to 72bp. This reduction does not cause loss recognition (only 84% of the gross profits are being used to amortize DAC), but it does cause a shift in how much of the DAC is amortized prior to 2003 and how much is amortized after 2003.

At the end of 2002, 36.8% of the DAC balance was expected to be amortized by the end of 2003. When the estimated future gross profits were reset at the end of 2003 assuming only 72bp of interest margin would be earned, 49.6% of the DAC balance was amortized in the past. This shift in amortization from the future to the past is all reflected in the 2003 financial results.

HTM

The net actuarial liability under the HTM valuation method is equal to the present value of current best estimate net contract related cash flows plus a margin for risk. In the illustration, the margin for risk is expressed as an additional cash flow equal to a percentage of the underlying risk capital. The percentage is fixed at issue such that there is no gain or loss at the time the product is sold. The discount rate is set equal to the then current crediting rate plus the priced for interest rate spread.

Under HTM, the discount rate and projected credit rate are both set assuming the initial crediting rate remains unchanged into the future. In 2008, the portfolio rate falls to a level that no longer supports an earned interest spread of 125 basis points (bp), after which time only a 72 bp spread is earned. Under HTM, this shortfall in profit margin is projected to continue unchanged into the future. However, the discount rate drops to a level that assumes 125bp spread is earned thereafter. The current liability is increased in order to support the level of cash flows associated with earning a smaller interest spread but using a discount rate that assumes 125bp will always be earned. This causes the reported loss in 2008 (policy duration 19).

The convergence of fair value and HTM liabilities is a result of no further changes in the interest rates and mortality charges after 2004.

Fair value

The net actuarial liability under the fair value method is equal to the value of the minimum interest rate guarantee plus the present value of current best estimate net contract related cash flows, ignoring any minimum interest rate guarantee, plus a margin for risk.

On any valuation date, the value of the UL interest rate guarantee is analogous to the value of an interest rate floor. The floor rate is the yield the insurer must earn to credit the guarantee with its expected spread. The notional principal on any date is the projected account value (average of beginning and end of year values); with the term of the floor is the term to expiry of the UL contract.

The floor pays an amount equal to the notional principal (account value) on any date, multiplied by the excess (if any) of the floor rate over the projected portfolio rate.

To value the floor, we need the following on each valuation date:

1. The current market yield curve
2. A (single) projection of future account values
3. An interest rate scenario generator
4. A projection of the portfolio yield for each scenario

With these, we can project the payments of the floor under each scenario and take the average present value. The result is the value of the interest rate guarantee.

For this purpose the projected portfolio yield is a moving seven-year average of seven-year bond yield rates.

In Chart 7, the margin for risk and uncertainty is expressed as an additional cash flow equal to a percentage of the underlying risk capital. The percentage is fixed at issue such that there is no gain or loss at the time the contract is sold. The discount rate is set equal to a single rate consistent with the yields used to project the deterministic cash flows of the contract, ignoring the minimum interest rate guarantee.

Chart 7: Illustration of earnings based on 100% premiums years 1-10 and 200% years 11+; discretionary participation features

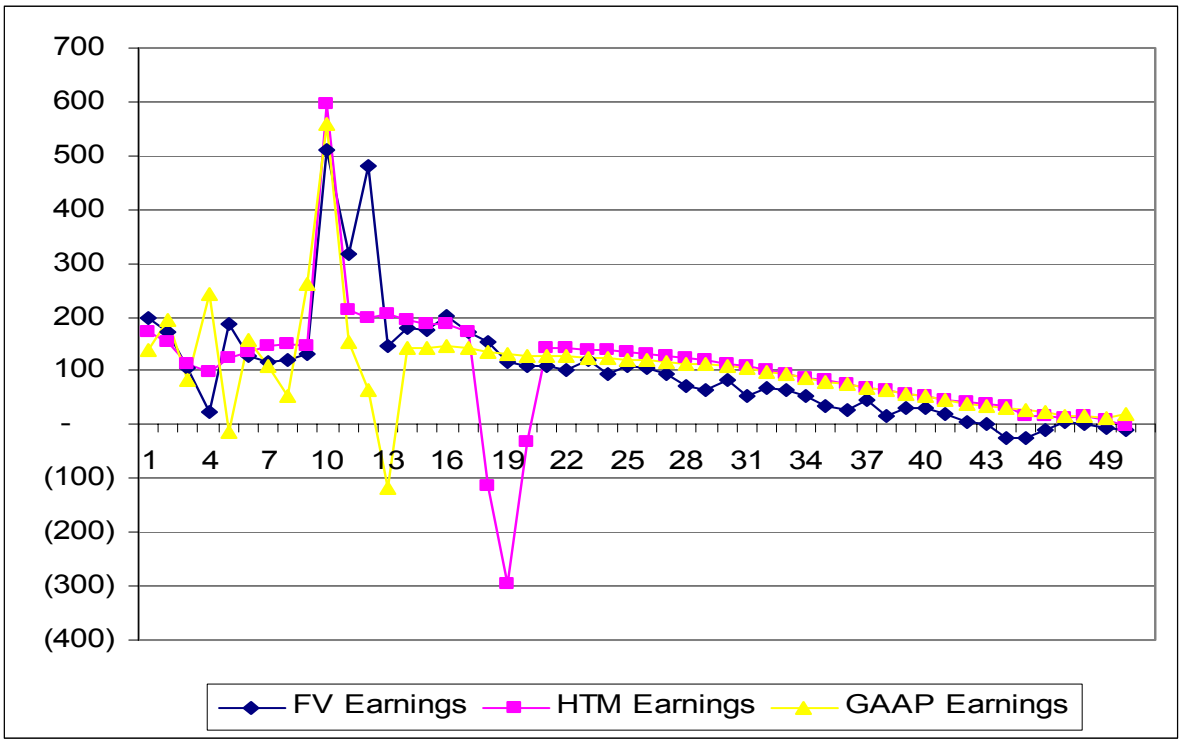
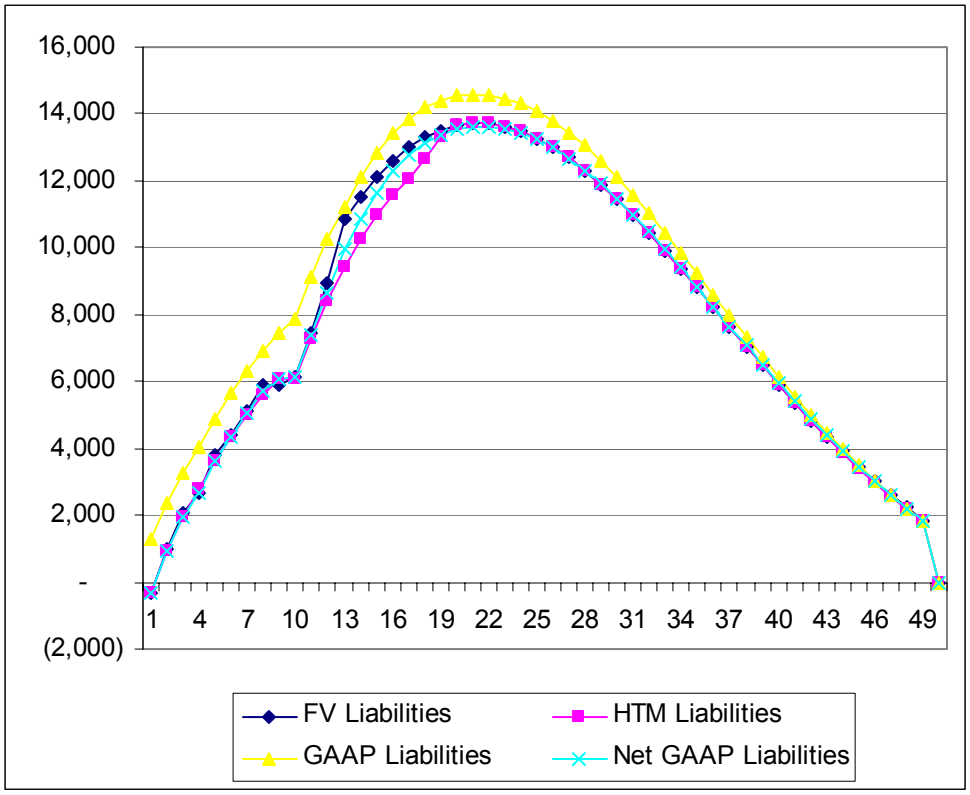


Chart 8: Illustration of liabilities based on 100 % premiums years 1-10 and 200% years 11+; discretionary participation features



APPENDIX 1 – PRICING, ASSET AND LIABILITY ASSUMPTIONS

A. Product pricing assumptions

Global assumptions

All calculations were done on a pre-income tax basis. No income tax has been assumed in the product pricing or in any of the financial illustrations.

Pricing assumptions

The product was priced to yield a 15% internal rate of return (IRR) on a statutory (regulatory accounting) basis. The profit load is included in the spread between interest earned and interest credited and in the spread between charges for the cost of insurance and expected cost of mortality. Below is a summary of the product specifications and pricing assumptions:

Product assumptions	
Face amount	$200,000
Issue date	December 31, 1990
Issue age	45
Maturity age	95
Gender	Male
Target premium rate per $1,000 death benefit	$9.79
Death benefit corridor minimum	DEFRA table
Guaranteed minimum interest credit rate	4.00%
Cost of insurance charges	
Current	65.7% of 1980 CSO NS ANB mortality table
Guaranteed maximum	100% of 1980 CSO NS ANB mortality table
Contract loads	
% of first year target premium	8.00%
% of renewal year target premium	2.00%
% of first year excess premium	3.00%
% of renewal year excess premium	3.00%
Monthly contract fee	$5.00
Surrender charge scale (per $1,000 death benefit)	
Contract year 1	$14.00
Contract year 2	$12.60
Contract year 3	$11.20
Contract year 4	$9.80
Contract year 5	$8.40
Contract year 6	$7.00
Contract year 7	$5.60
Contract year 8	$4.20
Contract year 9	$2.80
Contract year 10	$1.40
Contract years 11+	$0.00

Pricing assumptions	
Interest rate assumptions	
Gross earned rate	10.38%
Default cost	0.35%

Pricing assumptions		
Investment expense	0.03%	
Pricing net earned rate	10.00%	
Spread between earned and credit rate	1.25%	
Pricing credit rate	8.75%	
Non-commission expenses		
First year per contract	$210.00	
Renewal year per contract (annual)	$ 40.00	
Commissions	% of target premium	% of excess premium
Contract year 1	90.00%	3.00%
Contract years 2-10	7.50%	3.00%
Contract years 11+	2.00%	3.00%
Liability measurement basis	Statutory	
	Approximated using average of account value and cash value	
Risk based capital		
% of reserves	3.50%	
% of face amount	0.20%	
% of premium	1.00%	

B. Asset investment and yield assumptions

Investment strategy

A single investment strategy was evaluated. All free cash flows were assumed invested in corporate bonds with a maturity of seven years.

In all scenarios, reinvestment takes place annually. All bonds are purchased at par. Any negative cash flows result in selling a pro-rata share of the existing asset portfolio. Note that selling assets is not consistent with the classification of assets as held-to-maturity that is necessary for valuing assets at amortized cost. While the model has assumed sales of assets necessary to match cash flows, the amount of these sales is small. A more complicated mismatch strategy would be needed to avoid any sales at all. The simplifying assumption is not felt to affect the conclusions reached.

Asset default assumption

Defaults are reflected by a reduction to the coupon yield of each bond. The full principle amount is paid without reduction. The annual default assumption is 0.35%. This level default assumption was made to simplify the modeling effort. Defaults are in fact cyclical. However, actual defaults will affect all methods similarly and it is not felt that the simplifying assumption affects the conclusions reached.

Investment expense assumption

Investment expenses are reflected by a reduction to the coupon yield of each bond. The annual expense assumption is 0.03%.

Yield rates

A number of simplifications were made to reduce the modeling effort:

- All bonds are assumed to pay annual coupons.

- The yield spread between corporate bonds and risk-free assets is assumed to remain constant throughout the period studied. This assumption is not consistent with the historical experience. However, it is felt that this simplifying assumption does not alter the conclusions reached concerning relative earnings among the methods analyzed.
- Bonds are assumed to exist with terms to maturity beyond the observable yield curve. The yield rates on these bonds were set equal to the rates on the observable bond with the longest maturity.
- Yield rates for bonds with maturities between observable bond yields were linearly interpolated from observable yields.

Asset Valuation Assumptions

Two valuation methods were used.

Amortized cost: As all bonds were purchased at par, the amortized cost of the bond portfolio of the investment strategy is equal to the purchase price of the invested assets on hand plus any outstanding cash balance. The amortized cost of the strip portfolio is equal to the purchase price of the strips on hand plus the amortization of discount from purchase to the valuation date based on the spot yield at purchase.

Market value: Market value is approximated by discounting all cash flows expected to occur from the current asset portfolio at the spot interest rates corresponding to the corporate bond yield curve that exists at the valuation date.

C. Liability valuation assumptions

Fair value

The fair value liability is equal to the value of the minimum interest rate guarantee plus the present value of future contract cash flows using current best estimate assumptions and ignoring the minimum interest rate guarantee plus a provision for risk and uncertainty known as the market value margin (MVM).

Contract cash flows

Contract cash flows include estimated future premiums, death benefits, surrender benefits, and related expenses for acquisition and maintenance of the contract. Future contract cash flows are projected using best estimate assumptions as of the valuation date. Best estimates assume continuation of the current economic environment (i.e., the current yield curve continues into the future unchanged and future rates do not follow the forward rates) and estimates of how future credit rates will change based on that environment and the insurer chooses the investment strategy.

For example, assume an insurer:

1. Expects to have an equal amount of free cash flow in each of the first ten years of a contract
2. Invests all free cash flow in five year bonds which yield 6% in year 1, and 5% in year 2
3. Determines crediting rates based on the expected book yield of its investment portfolio
4. Performs a valuation at the end of the second contract year

At the end of the second year, the current portfolio would be earning 5.5% (half of the assets yield 6% and the other half yield 5%). Assuming the yield curve remained constant into the future (i.e. five-year bonds always earn 5%), the expected portfolio rate would decline as more 5% yielding bonds were added until in the 6th year when the original 6% bond matured and reinvested in a bond yielding 5% resulting in the portfolio rate leveling off at 5%. For fair value, the best estimate of

future credit rates would reflect this pattern of yields (subject to minimum guarantees) as it is based on management's investment policy and crediting rate determination policy.

Discount rate
The discount rate used in the calculation of fair value consists of a single discount rate consistent with the yields at which the future cash flows were projected. For the purposes of this research project, the yields are based on high-grade corporate bonds. For simplicity of modeling, a fixed 200bp is used to approximate the difference in yield between high-grade corporate bonds and Treasury bonds.

Risk and uncertainty margin
In theory, the MVM is the price that market participants require to accept non-financial risk (i.e., the risk that future cash flows are uncertain because of the existence of insurance or other non-financial risk). In practice, there is no deep, liquid market for insurance liabilities. Therefore, the price that market participants demand must be estimated. For the purpose of this research project, the MVM was calibrated to produce no gain or loss at issue, i.e. the initial liability is equal to the net proceeds of the contract at issue. This is also known as calibrating to "entry" price. Note that there are other ways to calibrate a risk margin. The MVM was expressed as a percentage of the risk capital needed to support the risks inherent in the product. The percentage is determined at issue and was kept constant throughout the projection, although MVMs would be reevaluated at each valuation along with all other assumptions.

Guarantees and options
The modeled UL contract has a minimum interest crediting rate guarantee, and a maximum cost of insurance charge guarantee. The minimum interest rate guarantee was valued using a stochastic technique that is outlined below. Today, there is no single measurement method that is generally accepted for valuing interest rate guarantees embedded in insurance contracts. One method that is felt to measure these guarantees in an appropriate manner is presented below for the interest of the Board.

On any valuation date, the value of the universal life interest rate guarantee is analogous to the value of an interest rate floor. The floor rate is the yield the insurer must earn to credit the guarantee with its expected spread. The notional principal on any date is the projected account value (average at the beginning and end of year), and the term of the floor is the term to expiry of the UL contract.

The floor pays an amount equal to the notional principal (i.e., account value) on any date, multiplied by the excess, if any, of the floor rate over the projected portfolio rate.

To value the floor, we need the following on each valuation date:

1. The current market yield curve
2. A (single) projection of future account values
3. An interest rate scenario generator
4. A projection of the portfolio yield for each scenario

With these, we can project the payments of the floor under each scenario and take the average present value. The result is the value of the interest rate guarantee.

For this purpose, the projected portfolio yield is assumed to be a moving seven-year average of seven-year bond rates.

The scenario generator

The scenario generator produces future paths of seven-year bond rates for use in calculating future portfolio yields. It is a lognormal generator with mean reversion using a trend adjustment that is calibrated to the starting yield curve.

Bond rates along a path are generated iteratively using this formula:

$$r_t = (r_{t-1} \times e^{v\theta}) + ((m - r_{t-1}) \times s) + T_t$$

where

$v =$ the volatility factor
$\theta =$ a random value from a "Normal" distribution with mean 0 and variance 1
$m =$ the mean value to which the series reverts
$s =$ the mean reversion strength or speed parameter
$T =$ the trend adjustment

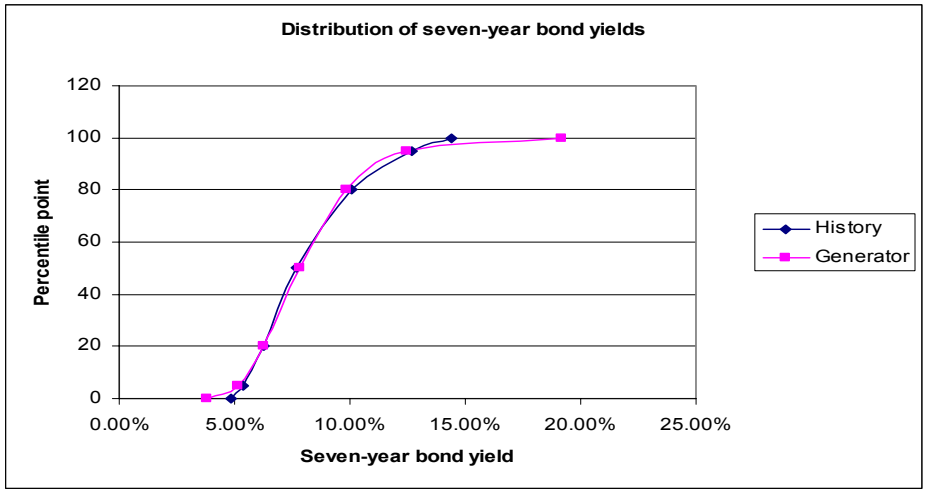
Calibration of the scenario generator

The value of *m* (the mean to which rates revert) is set equal to the farthest forward bond rate associated with the starting yield curve.

The value of *v* (annual volatility) is set based on historical data for seven-year Treasury bonds from December 1971 through January 2002. Reported bond yields for each month were used to compute moving 12-month averages. For each 12-month average, a sample volatility value was calculated as the logarithm of the ratio of that average rate to the average rate from twelve months prior. The standard deviation of these volatility values was 14.2%, which was used as the value of *v*.

The value of s (mean reversion strength) was chosen by viewing the distribution of generated bond yields in years 10-15 compared to the actual historical distribution. The generator was initialized with a flat starting yield curve with rates equal to the average seven-year bond rate in the historical data. The resulting distribution of rates compared to historical experience is shown in Chart 9 of S-curves. The tails of the distribution are longer for the generated values, arguably because there are many more of them. The points between 5% and 95% on the distributions fit reasonably well with *s* = 0.10.

Chart 9: Scenario distribution of S-curves



The values of T (trend adjustment) are calibrated so that the arithmetic average of the projected rates equals the forward bond rates associated with the starting yield curve. This calibration is done using successive approximations and a recursive process. One thousand scenarios are generated during each iteration and the average path of future bond rates is determined. Differences between that path and the path of forward bond rates in the starting yield curve are used to revise and refine the values of T for the next iteration. The process stops when the need for further adjustment of T is immaterial and the average path of the generated rates is essentially equal to the path of forward bond rates.

Sensitivity of results

Results are sensitive to the initial conditions (yield curve and portfolio rate) and to two parameters of the generator (volatility and mean reversion strength). Sensitivities are discussed below in the context of three very different sets of initial conditions:

- December 1993 (the guarantee is very far out of the money)
- December 2003 (the current market rate is below the guarantee)
- December 2003* (using the December 2003 account value projection, but with a flat yield curve equal to the floor and a portfolio rate equal to the floor)

In each case we will show the value of the guarantee using the following parameters:

1. Volatility assumptions of 11%, 12% and 13%
2. Mean reversion strength of 9%, 10% and 11%
3. Starting yield curve moved +/- 0.25% (parallel shift)
4. Starting portfolio yield moved +/- 0.25%
5. Range of values produced by ten different random number seeds. (Base case seed is -2)

Valuation date	Dec 1993	Dec 2003	Dec 2003*
Portfolio rate on valuation date:	8.68%	7.19%	5.25%
Market 7-year bond rate:	7.48%	4.72%	5.25%
Two-year forward 7-year bond rate:	8.26%	5.72%	5.25%
Account value	$2,750	$3,447	$3,447
Value of guarantee:			
Base case	$0.26	$0.99	$24.65
Volatility +1% (15.2%)	0.55	1.30	26.50
Volatility -1% (13.2%)	0.10	0.72	22.81
Mean reversion strength 11%	0.16	0.91	25.00
Mean reversion strength 9%	0.41	1.08	24.30
Starting yield curve +0.25%	0.14	0.55	17.70
Starting yield curve -0.25%	0.46	1.68	33.40
Starting portfolio yield +0.25%	0.26	0.93	18.05
Starting portfolio yield -0.25%	0.26	1.06	37.67
Min value by random number seed	0.24	0.79	23.84
Max value by random number seed	0.41	1.08	25.27

Observations on the sensitivity of the value to assumptions:

1. These values are very small, except when the guarantee gets close to being in the money, as in the last column above.
2. The value is always sensitive to the assumed volatility of interest rates
3. The value is relatively more sensitive to mean reversion strength when the guarantee is far out of the money.
4. The value is always sensitive to the level of the current yield curve
5. The value gets more sensitive to the portfolio yield as the guarantee gets closer to being in the money.
6. The use of "only" 1,000 scenarios means that the range of random estimation error is noticeable.

No adjustment has been made to reflect the credit standing of the insurer.

The initial mortality and lapse valuation assumptions were set equal to the pricing experience assumptions.

HTM

The HTM approach for insurance liabilities is in some ways similar to a fair value approach. In both cases, the liability value is calculated as a present value of future cash flows. The difference is that under fair value, the assumptions used to project the cash flows and the discount rate used for the present value are all adjusted at the end of each accounting period. Under HTM, the assumptions and discount rate are locked in when the contract is issued, and do not change unless a loss must be recognized. The assumptions are based on the price at issue, since MVMs would in many cases be calibrated to equate the premiums with the future benefits, expenses, and MVMs.

Insurance contracts with non-guaranteed payments, such as universal life, present special considerations. Since non-guaranteed payments can be constantly changed, it is not clear what it means to lock-in the valuation assumptions. In this context, the lock-in is applied to the margins included in the non-guaranteed elements. For example, if at the time of issue the discount rate used for measurement is 0.75% higher than the non-guaranteed interest rate credited to policyholders, then the 0.75% margin would be locked in, but the discount rate itself would float based on the current rate credited to policyholders. On any valuation date, both the credited rate and the discount rate was assumed to remain constant for all future years for liability valuation purposes, but they may have been different than the rates used on the previous valuation date if the insurer changed the credited rate in the interim. A similar procedure would apply to margins on other non-guaranteed charges such as those for mortality costs.

The HTM approach for insurance liabilities is analogous to the HTM approach for fixed income investments. The value of a bond that is held-to-maturity is equal to the present value of future interest and principal payments at a discount rate that is locked in when the instrument is purchased, and is based on the purchase price.

U.S. GAAP

The universal life product was valued in accordance with FAS 97. The contract liability is equal to the account value. DAC and unearned revenue are amortized using assumptions for lapse, mortality equal to those used in pricing. No provisions for adverse experience deviations were included. A loss recognition test is performed at each valuation date by comparing the carried DAC asset net of unearned revenue with the present value of future gross profits using assumptions current as of the valuation date.

APPENDIX 2 – DISCOUNT AND INTEREST RATE ISSUES

Single discount rate vs. the entire yield curve

One reasonable method of measuring the present value of a set of fixed and certain cash flows is to apply spot rates reflecting the current yield curve. To do so, each future cash flow is discounted to the valuation date from the expected time of the cash flows by the corresponding spot rate. By applying this method of valuation, the projection of cash flows is consistent with the corresponding discounting applied.

Whenever uncertain future cash flows are affected by changes in future interest rates, there is a need for consistency between the projection and discounting approach used for valuation. It is important to avoid the mistake of ignoring this need for consistency between the projection and it's discounting.

For example, consider the valuation of an insurance liability that is affected by changes in future interest rates. It is tempting to use the following approach for fair valuation:

- Project the future cash flows assuming that the yield curve on the valuation date remains unchanged in the future.
- Discount the projected future cash flows using the spot rates of the yield curve on the valuation date.

Whenever the yield curve is not flat, this method may be flawed. The flaw can be understood by considering the valuation of the liability for a money-market fund. For simplicity, assume a money-market fund with no expenses or expense charges. The liability is simply a deposit on which interest is credited at short-term market interest rates that change frequently. Deposits tend to be withdrawn over time; say they are withdrawn in 3 years on the average. The projected liability cash flows are these future withdrawal payments.

Also assume the yield curve is positively sloped, so the three-year spot rate is higher than the short-term rate. If the valuation approach proposed above is applied to this money-market fund, we first accumulate the fund value forward at current short-term rates, and then take the present value of the withdrawal amount in year 3 by discounting at the higher 3-year spot rate. The result is a liability value that is less than the current value of the fund. This result is contrary to the Board's tentative decision that the fair value of a demand liability cannot be less that the amount payable on demand. (See example below.) Likewise, the method can produce results that are inconsistent with the Board's tentative decision for many types of insurance liabilities that have interest-sensitive cash flows.

Money market fund valuation example

Current conditions:

Starting value in money market fund: $1,000
Short-term rate currently credited on the fund: 2.0%

Yield curve	Spot rate	Forward rate	
1-year	2.00%	2.00%	
2-year	2.70%	3.405%	$= [(1.027)^2 / (1.020)^1] - 1$
3-year	3.00%	3.602%	$= [(1.030)^3 / (1.027)^2] - 1$

Possible, measurement approach that produces liabilities below demand deposit floors

Withdrawal amount in three years = $\$1{,}000 \times (1.02)^3 = \$1{,}061.21$
Present value of withdrawal amount = $\$1{,}061.21 / (1.03)^3 = \$971.16$

The use of the initial yield curve over time (other than the special case of a flat yield curve) therefore produces unreasonable results, as the value must be at least $1,000. The result arises from the inconsistency between the approach used in the projection and in the interest discounting. If discounting uses spot rates based on the yield curve, continuation of the current yield curve should not be assumed, but rather should use projections using forward rates that change over time.

Correct valuation approach
Withdrawal amount in three years = $1,000 x (1.02) x (1.03405) x (1.03602) = $1,092.72
Present value of withdrawal amount = $1,092.72 / $(1.03)^3$ = $1,000.00

The result identified here is inherent in the application of an inconsistent methodology between that used to project the cash flows and that used to discount them. The projection assumption uses a yield curve that does not change over time. A more appropriate discounting method uses the full yield curve, built on forward rates that are updated over time. Such a mismatch between methods for projection and discounting will inevitably lead to measurements inconsistent with the Board's tentative decision for a demand deposit floor.

There are many methods that can be used to value interest-sensitive cash flows. The key to all of them is maintaining consistency between the interest rates used for projection of future cash flows and the interest rates used for discounting those cash flows. Maintaining this consistency is essential for a theoretically correct valuation. The exact method by which consistency is maintained can be less important, and is subject to practical considerations.

One practical consideration is the complexity of the valuation process. When discounting using all the spot rates in the full yield curve, consistency requires a projection of the liability under changing future interest rate conditions. The use of changing future interest rates adds complexity to the process. Simpler methods can produce results that differ by immaterial amounts. For example, the result of a valuation sometimes depends mainly on the difference between the discount rate and the rate credited to a liability account. In such a situation, a valuation based on a single discount rate and a single credited rate can provide results that are essentially the same as those from a valuation that uses a much more elaborate discounting process.

Other practical issues must also be addressed. The first and most obvious is what interest/discount rates should be used in the first place. Should the rate be based on tradable government securities or synthetically generated ones (e.g., strips, spots, swaps or repurchase rates)? Should the rate be based on securities that are traded in the most liquid market to maximize reliability? Although one hesitates to bring up practical cost-to-implement, the complexity of stochastic models used to measure liabilities that are interest-sensitive, i.e., where policyholder behavior would be expected to vary by level and shape of a yield curve, can be daunting to say the least. In cases where measurement is more sensitive to the consistency of interest and discount rates than to the level of these rates, simplification may be warranted.

The universal life liability measurement method for the host contract before consideration of the embedded minimum interest rate guarantee used for the illustrations in this paper achieves consistency between the interest rates used for projection and for discounting in the following way. We have assumed that the seven-year bond rate on the valuation date remains unchanged in the future. The liability is estimated by crediting interest at a rate equal to the projected portfolio yield

(for our portfolio of seven-year bonds valued at amortized cost) less the priced-for spread. Then future cash flows are discounted at the current seven-year bond rate.[3]

Calculations are made easy in our illustration because all investments are assumed to be in seven-year bonds and the interest credited to the liability is the yield on a portfolio of seven-year bonds less a spread. Projecting and discounting based on a seven-year bond rate is thus intuitively reasonable, and allows the explicit assumption of a spread that is commonly used to recover some expenses.

[3] The value of the guaranteed minimum interest crediting rate is treated separately in this paper. The valuation method just described is used to value the UL contract without the guarantee, and then a separate stochastic approach is used to value the guarantee.

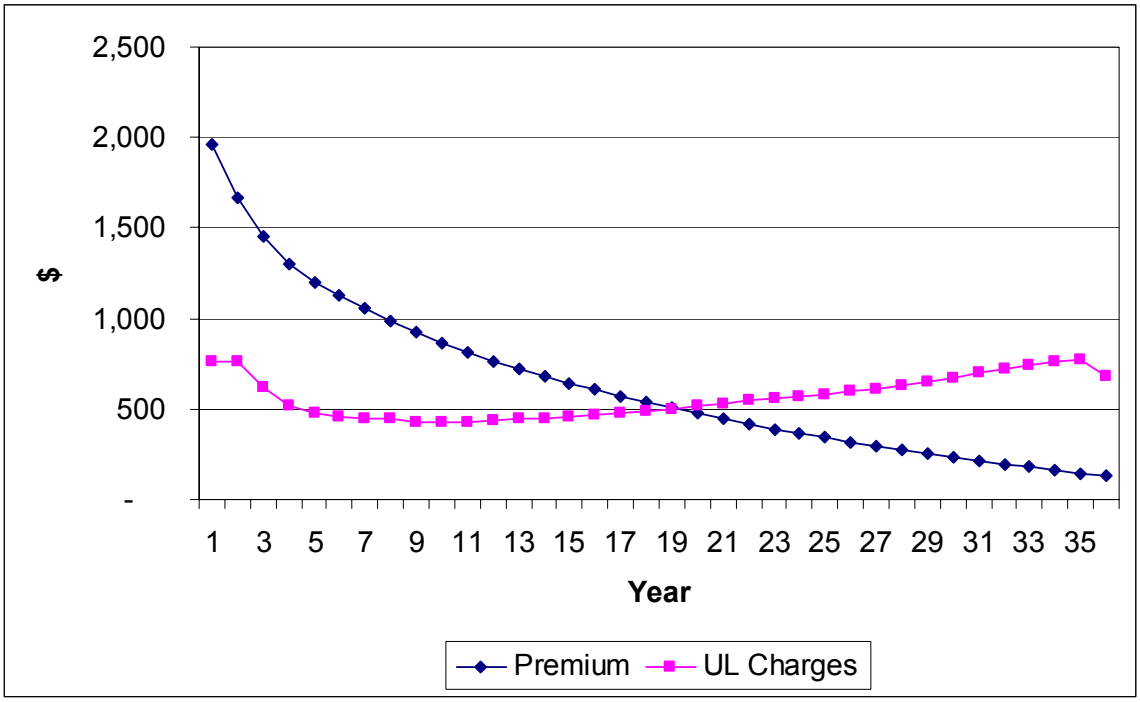
APPENDIX 3 – WHAT IS REVENUE?

While one of the objectives of this Report is to evaluate alternative approaches regarding the amount of premium to be recognized in the measurement of the liability of an insurance contract, the Report would be incomplete without some discussion about revenue recognition with respect to insurance contracts. In the U.S., two models in use are:

- Premiums are revenue, e.g., FAS 60 and FAS 120
- Contract charges are revenue, e.g., FAS 97

One issue that will be important to discuss during the Board's deliberations of Phase II of the Insurance Contracts Project will be revenue recognition. This is especially important for life insurance contracts, where different approaches can be applied; sometimes two types of contracts will involve similar expected cash flows. In U.S. GAAP for example, revenue for universal life follows the FAS 97, or contract charge approach, while traditional life contracts use a FAS 60, or premium approach. The following chart presents these two views of reporting revenue based on the "expected premium" scenario illustrated in this Report.

Chart 10: Alternative revenue measures



Critical to the discussion is an understanding of the contractual terms. Policyholders typically purchase level premium life insurance to avoid paying higher amounts in later years. Consequently, policyholders pay more than their current cost of insurance in the early years. Note that the premiums decline in the chart, as a result of contract termination over the lifetime of the block of business. The key point to take away from this chart is the difference between the two lines. In the early years, the premium exceeds the charges and is notably less in later years. The table below presents the numeric values for each year.

Accounting for UL contracts-FAS No. 97

Year	Premium	COI	Surrender charges	Expense charges	Change in UERV	Total charges	Differences
12/91	1,958	432	214	217	(105)	757	1,201
12/92	1,663	394	267	84	13	758	905
12/93	1,453	369	166	74	9	618	835
12/94	1,305	355	104	66	(3)	523	782
12/95	1,198	350	62	61	9	481	717
12/96	1,123	351	48	57	0	456	667
12/97	1,053	355	36	53	4	448	605
12/98	987	360	25	50	7	442	545
12/99	924	366	16	47	(4)	424	502
12/00	866	374	7	44	7	432	434
12/01	811	381	-	41	4	426	385
12/02	767	393	-	39	6	438	429
12/03	724	403	-	37	11	451	273
12/04	684	413	-	35	2	450	234
12/05	645	423	-	33	2	458	187
12/06	608	434	-	31	2	468	140
12/07	573	446	-	29	2	477	96
12/08	539	459	-	27	2	489	50
12/09	507	475	-	26	1	502	5
12/10	476	491	-	24	1	516	-40
12/11	446	508	-	23	1	532	-86
12/12	418	523	-	21	1	546	-128
12/13	391	538	-	20	1	559	-168
12/14	365	551	-	18	1	571	-206
12/15	341	564	-	17	1	582	-241
12/16	317	578	-	16	1	595	-278
12/17	294	594	-	15	1	610	-316
12/18	273	614	-	14	1	629	-356
12/19	252	636	-	13	2	651	-399
12/20	232	661	-	12	2	675	-443
12/21	213	684	-	11	3	698	-475
12/22	195	707	-	10	3	720	-525
12/23	178	728	-	9	3	740	-562
12/24	162	748	-	8	3	759	-597
12/25	147	767	-	7	3	777	-630
12/26	132	670	-	7	2	679	-547
Total	23,220					20,334	2,886

One view is that the excess amount in the early years represents a deposit, bifurcated from the explicit charges. In contrast, others emphasize that if the insured dies in the early years of the in-force contract, the beneficiary receives the specified death benefit, not the excess payments plus the specified death benefit.

In order to promote consistency and transparency, the Board may want to adopt a single method of revenue recognition. To aid in the decision making the process, answers to the following questions may be informative:

- Which is more relevant -- premiums or insurance charges?
- If both are relevant, which presentation would be preferable?

- Premiums as revenue with disclosure of insurance charges, or
- Insurance charges as revenue, with premiums presented as a component of cash flows

Are benefit payments an expense?

In a similar way, questions about benefit payments should be discussed. When premiums are recognized as revenue, benefit payments, claims and surrenders, are reported as expenses of the business. When charges are revenue, expenses only reflect the excess of benefits over the account value (AV). Questions about the recognition and reporting of benefits should accompany questions about premium recognition. The following table compares the two approaches.

	Benefits are expensed				**Excess charges**		
Year	Death Benefits	Surrender Benefits	Change in Liabilities	Total	Death Benefits in excess of AV	Interest on AV	Total
12/91	176	-	(314)	(138)	174	115	289
12/92	219	55	1,286	1,560	216	187	403
12/93	257	185	1,124	1,566	251	251	502
12/94	275	243	560	1,077	266	296	562
12/95	287	246	1,133	1,667	275	360	635
12/96	299	308	617	1,223	283	407	690
12/97	306	363	709	1,378	287	454	741
12/98	313	413	810	1,536	290	490	780
12/99	323	455	41	819	296	489	785
12/00	337	491	648	1,476	305	512	817
12/01	360	435	543	1,338	322	526	848
12/02	391	455	685	1,531	346	543	889
12/03	429	471	484	1,384	374	527	901
12/04	464	482	54	1,000	400	515	915
12/05	495	488	(18)	965	422	488	910
12/06	501	490	(62)	928	422	446	868
12/07	522	487	(112)	897	435	422	856
12/08	544	480	(144)	880	449	382	831
12/09	566	470	(173)	863	463	361	824
12/10	586	457	(221)	822	476	351	827
12/11	606	441	(273)	774	488	339	828
12/12	625	423	(314)	734	501	326	826
12/13	643	403	(353)	694	513	310	824
12/14	662	381	(390)	653	527	293	820
12/15	679	357	(425)	611	540	275	815
12/16	696	331	(458)	569	554	255	808
12/17	711	303	(488)	526	568	233	801
12/18	724	274	(514)	483	582	211	792
12/19	733	242	(535)	440	595	186	781
12/20	739	209	(552)	397	609	161	770
12/21	744	175	(565)	354	624	135	759
12/22	746	140	(574)	311	642	107	749
12/23	747	103	(580)	270	662	79	741
12/24	745	67	(582)	229	685	51	736
12/25	739	30	(580)	190	709	23	733
12/26	620	0	(466)	154	620	0	620

APPENDIX 4 – TABLES UNDERLYING CHARTS IN REPORT

The tables below contain the details supporting the results presented in the charts included in the Report. For Chart 1b, while the premiums paid are identical for the three scenarios, representing amounts paid by the policyholder, the results vary due to the underlying assumptions for measurement of the insurance contract liabilities. Investment income, benefit payments and expenses are also identical. The second table illustrates the annual balance sheet results with the change in the liabilities being the only variable.

Chart 1b Yearly premiums and net income

	No renewal premiums		Expected renewal premiums		Minimum required premiums	
	Premiums	Net Income	Premiums	Net Income	Premiums	Net Income
12/91	1,958	(858)	1,958	197	1,958	(20)
12/92	1,663	666	1,663	170	1,663	345
12/93	1,453	251	1,453	106	1,453	133
12/94	1,305	7	1,305	25	1,305	(5)
12/95	1,198	148	1,198	188	1,198	232
12/96	1,123	107	1,123	129	1,123	120
12/97	1,053	90	1,053	115	1,053	129
12/98	987	115	987	121	987	1
12/99	924	156	924	133	924	106
12/00	866	114	866	189	866	333
12/01	811	381	811	363	811	317
12/02	767	214	767	214	767	465
12/03	724	118	724	84	724	141
12/04	684	125	684	104	684	132
12/05	645	126	645	105	645	131
12/06	608	170	608	136	608	161
12/07	573	149	573	121	573	143
12/08	539	143	539	105	539	125
12/09	507	109	507	75	507	91
12/10	476	96	476	62	476	75
12/11	446	79	446	51	446	63
12/12	418	83	418	52	418	62
12/13	391	104	391	81	391	90
12/14	365	98	365	68	365	74
12/15	341	92	341	70	341	75
12/16	317	83	317	59	317	61
12/17	294	65	294	42	294	43
12/18	273	38	273	23	273	24
12/19	252	42	252	22	252	25
12/20	232	68	232	50	232	54

Chart 1b Balance Sheet by Year

	No renewal premiums			Expected renewal premiums			Minimum required premiums		
	Assets	Liabilities	Surplus	Assets	Liabilities	Surplus	Assets	Liabilities	Surplus
12/91	827	741	86	827	(314)	1,141	827	(97)	924
12/92	1,622	1,532	90	1,622	972	650	1,622	1,015	607
12/93	2,875	2,511	364	2,875	2,096	779	2,875	2,113	763
12/94	3,478	3,089	389	3,478	2,656	823	3,478	2,703	776
12/95	4,815	4,262	552	4,815	3,789	1,026	4,815	3,792	1,022
12/96	5,558	4,901	657	5,558	4,406	1,152	5,558	4,419	1,139
12/97	6,355	5,635	720	6,355	5,115	1,239	6,355	5,113	1,242
12/98	7,247	6,450	797	7,247	5,925	1,322	7,247	6,043	1,204
12/99	7,372	6,468	903	7,372	5,966	1,406	7,372	6,111	1,261
12/00	8,142	7,192	950	8,142	6,614	1,527	8,142	6,616	1,526
12/01	8,932	7,716	1,215	8,932	7,158	1,774	8,932	7,205	1,727
12/02	9,688	8,402	1,287	9,688	7,843	1,846	9,688	7,639	2,049
12/03	10,122	8,852	1,269	10,122	8,327	1,795	10,122	8,066	2,056
12/04	10,162	8,885	1,276	10,162	8,381	1,781	10,162	8,093	2,069
12/05	10,146	8,846	1,300	10,146	8,363	1,782	10,146	8,048	2,097
12/06	10,077	8,750	1,327	10,077	8,301	1,776	10,077	7,962	2,115
12/07	9,974	8,609	1,365	9,974	8,189	1,785	9,974	7,827	2,147
12/08	9,827	8,427	1,400	9,827	8,044	1,783	9,827	7,663	2,164
12/09	9,636	8,221	1,415	9,636	7,871	1,764	9,636	7,474	2,161
12/10	9,390	7,965	1,425	9,390	7,651	1,739	9,390	7,240	2,149
12/11	9,079	7,665	1,414	9,079	7,378	1,701	9,079	6,956	2,123
12/12	8,726	7,320	1,406	8,726	7,064	1,662	8,726	6,632	2,094
12/13	8,363	6,944	1,419	8,363	6,712	1,651	8,363	6,270	2,093
12/14	7,952	6,524	1,428	7,952	6,322	1,631	7,952	5,874	2,079
12/15	7,512	6,077	1,435	7,512	5,896	1,615	7,512	5,444	2,068
12/16	7,028	5,595	1,434	7,028	5,438	1,590	7,028	4,983	2,045
12/17	6,497	5,084	1,414	6,497	4,949	1,548	6,497	4,494	2,004
12/18	5,916	4,554	1,363	5,916	4,435	1,481	5,916	3,978	1,938
12/19	5,304	3,998	1,306	5,304	3,900	1,405	5,304	3,440	1,864
12/20	4,694	3,427	1,267	4,694	3,348	1,346	4,694	2,883	1,810

The following tables provide the details for chart 2b along with the balance sheet, assets, liabilities and surplus, for the ten years. Again, note that the change in liabilities between years is the only variable, which can have a significant impact on earnings.

Chart 2b Yearly premiums and net income

	No renewal premiums		Expected renewal premiums		Minimum renewal premiums	
	Premiums	Net Income	Premiums	Net Income	Premiums	Net Income
12/91	1,958	(858)	1,958	197	1,958	(20)
12/92	3,621	(192)	3,621	367	3,621	325
12/93	5,074	59	5,074	474	5,074	457
12/94	6,379	66	6,379	499	6,379	452
12/95	7,577	214	7,577	687	7,577	684
12/96	8,700	321	8,700	816	8,700	804
12/97	9,753	412	9,753	931	9,753	933
12/98	10,740	527	10,740	1,052	10,740	934
12/99	11,664	683	11,664	1,185	11,664	1,040
12/00	12,530	797	12,530	1,374	12,530	1,373

Chart 2b Balance Sheet by year

	No renewal premiums			Expected renewal premiums			Minimum renewal premiums		
	Assets	Liabilities	Surplus	Assets	Liabilities	Surplus	Assets	Liabilities	Surplus
12/91	827	741	86	827	(314)	1,141	827	(97)	924
12/92	2,450	2,273	177	2,450	659	1,791	2,450	919	1,531
12/93	5,325	4,784	541	5,325	2,755	2,570	5,325	3,031	2,294
12/94	8,803	7,873	930	8,803	5,411	3,392	8,803	5,734	3,069
12/95	13,618	12,135	1,483	13,618	9,200	4,418	13,618	9,526	4,092
12/96	19,176	17,036	2,140	19,176	13,606	5,570	19,176	13,945	5,231
12/97	25,531	22,671	2,860	25,531	18,721	6,809	25,531	19,058	6,473
12/98	32,778	29,121	3,657	32,778	24,646	8,132	32,778	25,101	7,677
12/99	40,150	35,589	4,560	40,150	30,612	9,538	40,150	31,212	8,938
12/00	48,291	42,781	5,510	48,291	37,226	11,065	48,291	37,828	10,463

The following tables provide the details for charts 3 through 6 with balance sheet, assets, liabilities and surplus values. Again, note that the change in liabilities between years is the only variable, which can have a significant impact on earnings.

Charts 3 and 4 Yearly premiums and net income

		HTM Approach		FV Approach	
	Premiums	Guaranteed and non-guaranteed elements net income/(loss)	Guaranteed elements only net income/(loss)	Guaranteed and non-guaranteed elements net income/(loss)	Guaranteed elements only net income/(loss)
12/91	1,958	174	3,512	197	4,251
12/92	1,663	153	231	170	318
12/93	1,453	112	159	106	310
12/94	1,305	99	223	25	(29)
12/95	1,198	125	167	188	457
12/96	1,123	134	207	129	188
12/97	1,053	148	168	115	177
12/98	987	151	61	121	153
12/99	924	146	137	133	28
12/00	866	595	2,134	510	3,277
12/01	1,621	212	225	318	461
12/02	1,533	198	(11)	481	526
12/03	1,449	204	50	207	171
12/04	1,368	202	7	205	113
12/05	1,290	198	(53)	202	130
12/06	1,216	209	65	233	113
12/07	1,146	192	(69)	204	98
12/08	1,078	186	(87)	226	78
12/09	1,014	190	(23)	230	107
12/10	952	212	117	229	64
12/11	893	207	92	204	50
12/12	836	205	72	194	(12)
12/13	782	201	52	218	30
12/14	731	197	33	182	(28)
12/15	681	192	14	197	(50)
12/16	634	187	(10)	193	(41)
12/17	588	181	(71)	188	(65)
12/18	545	175	(89)	159	(130)
12/19	504	169	(94)	146	(128)
12/20	464	161	(68)	166	(123)

Chart 5 Balance Sheet-FV

	Guaranteed & non-guaranteed			Guaranteed Only		
	Assets	Liabilities	Surplus	Assets	Liabilities	Surplus
12/91	827	(314)	1,141	827	(4,368)	5,195
12/92	1,622	972	650	1,622	(3,230)	4,852
12/93	2,875	2,096	779	2,875	(2,310)	5,185
12/94	3,478	2,656	823	3,478	(1,696)	5,174
12/95	4,815	3,789	1,026	4,815	(832)	5,646
12/96	5,558	4,406	1,152	5,558	(274)	5,832
12/97	6,355	5,115	1,239	6,355	372	5,982
12/98	7,247	5,925	1,322	7,247	1,150	6,097
12/99	7,372	5,966	1,406	7,372	1,296	6,076
12/00	8,142	6,294	1,848	8,142	(1,144)	9,286
12/01	9,753	7,708	2,044	9,753	128	9,625
12/02	11,378	9,008	2,370	11,378	1,383	9,995
12/03	12,238	9,813	2,426	12,238	2,224	10,014
12/04	13,056	10,573	2,483	13,056	3,076	9,980
12/05	13,761	11,222	2,539	13,761	3,796	9,965
12/06	14,361	11,791	2,570	14,361	4,485	9,876
12/07	14,868	12,269	2,599	14,868	5,069	9,799
12/08	15,308	12,659	2,649	15,308	5,608	9,700
12/09	15,656	12,966	2,690	15,656	6,038	9,618
12/10	15,895	13,196	2,699	15,895	6,433	9,463
12/11	16,033	13,353	2,680	16,033	6,743	9,290
12/12	16,087	13,439	2,648	16,087	7,035	9,051
12/13	16,095	13,457	2,637	16,095	7,242	8,853
12/14	16,004	13,411	2,592	16,004	7,406	8,598
12/15	15,867	13,303	2,564	15,867	7,545	8,322
12/16	15,670	13,137	2,533	15,670	7,612	8,058
12/17	15,413	12,915	2,498	15,413	7,644	7,769
12/18	15,075	12,643	2,432	15,075	7,661	7,414
12/19	14,675	12,326	2,349	14,675	7,618	7,057
12/20	14,254	11,969	2,285	14,254	7,551	6,704

Chart 6 Balance Sheet-HTM

	Guaranteed & non-guaranteed			Guaranteed only		
	Assets	Liabilities	Surplus	Assets	Liabilities	Surplus
12/91	780	(338)	1,118	780	(3,676)	4,456
12/92	1,539	931	609	1,539	(2,486)	4,025
12/93	2,670	1,926	744	2,670	(1,538)	4,207
12/94	3,658	2,797	861	3,658	(790)	4,448
12/95	4,616	3,615	1,001	4,616	(13)	4,630
12/96	5,484	4,352	1,132	5,484	649	4,835
12/97	6,265	5,013	1,252	6,265	1,290	4,975
12/98	6,962	5,596	1,365	6,962	1,964	4,998
12/99	7,549	6,087	1,462	7,549	2,464	5,086
12/00	8,058	6,069	1,990	8,058	906	7,152
12/01	9,377	7,298	2,079	9,377	2,122	7,255
12/02	10,543	8,422	2,122	10,543	3,454	7,089
12/03	11,583	9,408	2,175	11,583	4,596	6,987
12/04	12,501	10,272	2,229	12,501	5,655	6,846
12/05	13,294	11,013	2,281	13,294	6,646	6,648
12/06	13,940	11,651	2,289	13,940	7,429	6,511
12/07	14,499	12,194	2,305	14,499	8,234	6,266
12/08	14,942	12,627	2,315	14,942	8,940	6,002
12/09	15,270	12,953	2,317	15,270	9,479	5,790
12/10	15,493	13,183	2,309	15,493	9,805	5,688
12/11	15,637	13,342	2,294	15,637	10,079	5,558
12/12	15,704	13,431	2,272	15,704	10,300	5,403
12/13	15,698	13,452	2,246	15,698	10,471	5,227
12/14	15,624	13,409	2,215	15,624	10,591	5,033
12/15	15,485	13,303	2,182	15,485	10,663	4,822
12/16	15,283	13,138	2,145	15,283	10,695	4,588
12/17	15,021	12,918	2,103	15,021	10,727	4,294
12/18	14,700	12,647	2,053	14,700	10,721	3,980
12/19	14,325	12,332	1,993	14,325	10,667	3,657
12/20	13,900	11,975	1,924	13,900	10,541	3,359

Chart 8 – Balance Sheet

Year	FV Liability	HTM Liability	GAAP Net Liability	GAAP Gross Liability	DAC
12/91	(314)	(338)	(302)	1,314	1,616
12/92	972	931	924	2,347	1,424
12/93	2,066	1,926	1,949	3,242	1,294
12/94	2,643	2,797	2,677	4,069	1,392
12/95	3,772	3,615	3,632	4,887	1,256
12/96	4,390	4,352	4,344	5,638	1,294
12/97	5,093	5,013	5,045	6,314	1,269
12/98	5,873	5,596	5,727	6,913	1,186
12/99	5,898	6,087	6,102	7,420	1,318
12/00	6,150	6,069	6,121	7,869	1,748
12/01	7,474	7,298	7,407	9,104	1,697
12/02	8,968	8,422	8,663	10,233	1,570
12/03	10,848	9,408	9,972	11,218	1,246
12/04	11,543	10,263	10,876	12,090	1,214
12/05	12,118	10,976	11,633	12,820	1,187
12/06	12,607	11,566	12,266	13,404	1,138
12/07	12,999	12,042	12,775	13,868	1,092
12/08	13,300	12,662	13,146	14,196	1,050
12/09	13,516	13,337	13,394	14,412	1,018
12/10	13,652	13,652	13,548	14,543	995
12/11	13,712	13,712	13,625	14,594	968
12/12	13,700	13,700	13,630	14,568	939
12/13	13,619	13,619	13,565	14,471	907
12/14	13,474	13,474	13,434	14,308	874
12/15	13,266	13,266	13,240	14,081	841
12/16	13,001	13,001	12,988	13,795	808
12/17	12,682	12,682	12,680	13,453	773
12/18	12,314	12,314	12,321	13,056	735
12/19	11,903	11,903	11,917	12,611	693
12/20	11,455	11,455	11,474	12,120	646
12/21	10,974	10,974	10,995	11,592	596
12/22	10,463	10,463	10,487	11,031	545
12/23	9,928	9,928	9,953	10,446	493
12/24	9,371	9,371	9,397	9,841	444
12/25	8,798	8,798	8,826	9,223	398
12/26	8,215	8,215	8,243	8,598	355
12/27	7,627	7,627	7,656	7,970	314
12/28	7,041	7,041	7,071	7,346	275
12/29	6,463	6,463	6,494	6,732	238
12/30	5,901	5,901	5,932	6,135	203
12/31	5,356	5,356	5,389	5,558	170
12/32	4,834	4,834	4,868	5,008	139
12/33	4,339	4,339	4,375	4,487	112
12/34	3,908	3,864	3,905	3,991	86
12/35	3,469	3,412	3,443	3,505	62
12/36	3,044	2,976	3,001	3,043	42
12/37	2,630	2,563	2,583	2,610	26
12/38	2,228	2,174	2,198	2,210	13
12/39	1,854	1,829	1,848	1,848	(0)
12/40	0	0	0	(0)	(0)

APPENDIX 5 – PROJECT PARTICIPANTS

American Council of Life Insurers

Alan Close, CPA	Chairman, Accounting Committee
Jim Renz	Staff Representative
Dave Sandberg, FSA, MAAA	Accounting & Actuarial Committee
Henry Siegel , FSA, MAAA	Actuarial Committee
Steve Strommen, FSA, MAAA	Actuarial Committee

International Actuarial Association

Sam Gutterman, FSA, FCAS, MAAA	Chairman, Insurance Accounting Committee
Paul McCrossan, FSA, FCIA, MAAA	Vice-Chairman, Insurance Accounting Committee
Francis Ruygt	Vice-Chairman, Insurance Accounting Committee
William Hines, FSA, MAAA	Chief researcher
Craig Lewis	Assistant researcher

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