LETTERS TO THE
NATIONAL ASSOCIATION OF INSURANCE COMMISSIONERS
LIFE/HEALTH ACTUARIAL TASK FORCE
REGARDING THE
DEVELOPMENT OF THE NEW ANNUITY NON-FORFEITURE LAW

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November 24, 1992

Mr. Howard Kayton
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Dear Mr. Kayton,

On behalf of LifeUSA, I am grateful to have opportunity to
comment on the 11/10/92 Draft Report of Advisory Committee
on the Revision of Annuity Non-Forfeiture Laws. The draft
has a few points that I am concerned with.

**The basic issue is defining what is equitable between
terminating and annuitizing policyholders, and how the
definition should be represented in the non-forfeiture law.**

If there is any material on background research completed by
the committee, I would welcome a copy. At this time, I only
have the draft report and my own basic principles on equity
and fairness.

Basic Principles

The basic principles I used to review the draft include:

      i)   Terminating and persisting policyholders should
          not be forced to subsidize one another;

     ii)   Any measure of equity must include the effect
          and cost of disintermediation risks on different
          policyholders (such risks can be measured and
          priced using actuarial principles); and

    iii)   Even the most basic cash value benefit can be
          inequitable if it is not accompanied by full and
          proper disclosure of contract provisions.

The following are comments based on applying some of these
principles to specific sections of the Draft Report. For
clarity, I have indicated the page number and quoted the
section I am referring to.

*Definition of Equity Between Terminating and Persisting
Policyholders*

On page 6, the report states:

"...the principal focus of any revision to the
Annuity Non-Forfeiture Law should be to reduce the
maximum divergence of account values and cash
surrender values. ... we believe that these
differences should be restricted to a fairly narrow
range in order to preserve equity".

Also, on page 8, equity between terminating and
persisting policyholders is defined by:

"[For the 1st $9,500,]...the ratio of the cash
value to the account value must be at least 80% for
the first 10 contract years, and 90% thereafter;
for the balance of the account the ratio must be at
least 90% for all years."

and

"The ratio...shall not decrease by more than 2%
from the same ratio for one year prior..."

Comments

I agree that defining and protecting equity between
terminating and persisting policyholders should be the
foundation for any revisions to the annuity
nonforfeiture law.

However, establishing narrow, fixed limits does not
preserve equity. In fact, eliminating or severely
limiting differentiation between classes reduces the
ability to treat different classes equitably.

A more effective approach is to ensure that all
policyholders have equal opportunity to elect the
benefits in the policy that they prefer through
meaningful, complete disclosure.

Equity should be defined through the application of actuarial methodology to the benefits provided under different contract provisions. Guiding actuarial principles should be identified and provide the foundation for the nonforfeiture law. Flexible formulas and indexes provide a better regulatory framework and reduce the need to update model laws and regulations when product designs evolve and financial conditions change.

The suggested approach ignores any definition of equity and "carves in stone" specific, arbitrary regulatory limits (eg, a set 90% factor, or a set 2% factor). It is simplistic to think that a flat 10% factor bares any relationship to the complexity of disintermediation risk or the complex interplay between persisting and terminating policyholders.

Finally, such arbitrary regulatory limits force product design limitations and give a false feeling of security that complying with the law means equity is preserved and risks are controlled.

Preserving equity and controlling risks are not that simple of tasks.

Disintermediation Risk

On page 4 of the draft report, a guiding principle for disintermediation risk is presented, along with the following concern:

> "...others choose to ignore the cost of this risk [C-3 risk] or even the presence of this risk. From a solvency perspective, this latter strategy is short-sighted".

Comments

The proposed minimum 90% and maximum 2% limits are not consistent with the expressed concern about disintermediation risk. These limits actually increase potential disintermediation risks by restricting a company's risk management alternatives to a narrow range of actions. Solvency concerns are also increased, since the proposed limits decrease a company's ability to control disintermediation risk through providing policyholder annuitization incentives.

One approach to achieving equity is by crediting one
interest rate to a cash surrender value, and a second
interest rate to an annuitization value that can only
be paid-out as an annuity (ie, a two tiered annuity).
This practice gives management powerful tools to limit
disintermediation risk and increase the benefits
provided to long-term policyholder in exchange for
their reducing the company's risks.

However, the proposed report's narrow limits prevent
crediting higher interest rates to the account value
for more than a few years. If a 10% initial premium
load is used for only the cash value, then <u>no</u> interest
difference is permitted. If no initial premium load
is used, then a 2% interest difference results in the
90% limit being hit after only 5 years. Considering
the cost of issuing new business and the long term
exposure to disintermediation risk, the 90% limit does
not seem reasonable.

Subsidizing the cost of termination

On page 5, the report states:

> "It was recognized that we must maintain a
> reasonable equity between surrendering and
> persisting contractholders."

Comments

In reviewing the 90% and 2% limits, I have concluded
they require annuitizing policyholders to subsidize
lump sum terminations. This is not an equitable
arrangement.

Consider the risk differences between an annuitized
account values and a lump-sum surrender. Looking at
four sample policies:

Policy A:	Purchases a deferred annuity today. After 2 years, it is surrendered for a lump sum.
Policy B:	Purchases a deferred annuity today. After 5 years, it is surrendered for a lump sum.
Policy C:	Purchases a deferred annuity today. After 5 years, selects a 5 year annuity certain.
Policy D:	No action today. After 5 years, purchases an immediate annuity.

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For all policies, the initial expenses total 10% of premium.

Using the proposed 90% limit, a two-tiered deferred annuity would not be allowed.

Let's assume the following yield curve:

Year	Interest Rate
1	4.0%
2	4.5%
5	6.0%
7	6.5%
10	7.0%

The assets bought for Policy A only yield a short term interest rate of about 4%. This would seem like a reasonable credited interest rate.

The assets for Policy B yield 6%. However, due to the proposed 90% limit, a two-tier structure cannot be used and there is no method to credit a long term interest rate to a policy. Our sample company is forced to credit the same interest rate to both Policy A and B.

When Policy A leaves, it receives more interest than earned by the assets backing the contract. Policy B was forced to subsidize Policy A.

Also, the disintermediation risk for our sample company was increased by crediting the same interest rate to both Policy A and B. Since Policy B has not received an equitable long-term interest rate, it is actually being <u>encouraged to terminate</u> and move its funds to a different investment.

The assets for Policy C yield about 6.5%. During the deferment period, Policy C has the same problem of being forced to subsidize Policy A. This also (again) subjects our sample company to a higher risk of disintermediation.

During the pay-out period, Policy C subsidizes Policy D. This happens since our sample company requires that all annuities elected in a year have the same credited interest rate. The assets needed for Policy C are still yielding about 6.5%, but recently

purchased assets for Policy D are only yielding about
4.5%.

In my example, **the one policy that followed the true
purpose of an annuity contract, Policy C, had the
highest yielding assets and presented the least
disintermediation risk, but was forced to subsidize
other policies the most.** Policy C received
inequitable treatment due to the 90% limit.

The 90% limit prevents equity and encourages
subsidization of terminating policyholders by
persisting policyholders. This is in direct
opposition to the principles used by Guertine in
creating the first standard nonforfeiture law. From
his 1941 original paper on nonforfeiture benefits:

> "It should be the objective of the state to
> establish minimum non-forfeiture benefits on such a
> basis that continuing policyholders will not be
> unduly penalized on account of the granting of
> excessive non-forfeiture benefits to policyholders
> who terminate their contracts, but the withdrawing
> policyholders should be granted the largest values
> which can be granted without violating this
> condition."

I'd recommend further research and discussions before
any limitations are proposed.

Relationship between 90% factor and Initial Premium Load

The report (page 6) states:

> "..must have consistency between ... front end
> sales loads and those with surrender charges."

and

> "The Advisory Committee believes that the maximum
> sales load against the premium, whether expressed
> as a front end sales load or as a back end
> surrender charge, should be limited to 10%".

Comments

Is the premium load the real foundation for the
required minimum 90% ratio of the cash value to the
account value?

I'd expect such a ratio to be based on disintermediation risk. Again, the foundation for determining factors should be actuarial principles applied to the measurement of risk.

After all, the issue is equity between persisting and terminating policyholders.

The initial premium load is related to the expenses of issuing a policy. It has no connection to the expense of providing a cash value, and no connection to the disintermediation risk assumed.

Equity can better be served through measuring risks and reflecting them in policy benefits, rather than unrelated assumptions.

So, how is the 90% ratio providing equity in policyholder selections? (That is, if it is based on the initial premium load).

The 100 Basis Points for Providing Lump Sum Benefits

On page 3, the report discusses two-tiered annuities:

"This option has been priced by some studies that indicate this "cost" to be as much as 100 basis points annually".

Comments

The draft is unclear as to what the 100 basis point cost is referring to.

If read carefully, it refers to the decrease in the portfolio yield when investments are made to meet cash value liquidity needs.

However, an incorrect conclusion could be made that 100 basis points is the largest equitable difference in interest rates between cash benefits and annuitized benefits.

In the proposed report, I am very glad the liquidity cost is recognized as a valid difference in cost, but providing a "100 basis points" reference without full explanation will result in mis-interpretation. We know that a much larger differential can be justified by simply looking at the difference between cash

equivalents and 5 year debt securities in a current yield curve.

I recommend the draft be changed to either remove the reference to the 100 basis points, or provide a clear example of what the 100 basis points is referring to.

Increasing the Chance of Congressional Changes to the Tax Deferral of Annuity Interest

Comments

The tax deferred status of annuity interest was allowed by Congress for the purpose of providing for long term <u>retirement</u> income needs.

By requiring lump-sum terminations to have high cash values and high liquidity, the nonforfeiture law makes annuities appear to be "just like" any other investment vehicles.

But an annuity has the special purpose of providing a steady income over a long period of time. Short term liquidity is not consistent with this definition.

My concern is that Congress might decide annuities do not deserve preferential tax treatment since there is no significant difference between a lump sum liquidation and annuitization. The 90% limit does not provide a substantial difference.

In fact, this was proposed by President Bush in 1992. Since Congress continues to be in a "revenue enhancement" mode, I'm sure they will consider all options to increase the tax base.

Do we want to position the insurance industry to fight this battle at this time? Would the loss of tax-deferral be in the best interests of policyholders?

Additional Comments

In reviewing the draft report, I make a number comments on miscellaneous other points. I've included these in Attachment #1 for your review.

Summary

Based on the discussions in the past few years between the insurance industry and the regulators, the desired

outcome of revising the annuity non-forfeiture law is the definition of equity between termination and persisting policyholders.

This issue needs careful consideration and discussion. I believe care must be taken to avoid placing into law inflexible limits that ignore the underlying risks. Without knowing the full extent of the background work completed, I believe the proposed report is premature in suggesting the 90% and 2% limits.

Closing

Thank you for the opportunity to comment on the proposed report of the Advisory Committee on Revision of Annuity Non-Forfeiture Laws.

Again, if there is any material on background research completed by the committee, I would welcome a copy. Also, I would welcome a chance to review or comment on any further material produced by the committee.

If you have any questions about my comments, please contact me at (612) 525-6428.

Sincerely,

Roger K. Wiard-Bauer, FSA, MAAA
Product Actuary
LifeUSA

Comments to Specific Passages in Draft Report

Refer to page numbers in Proposed Report

Page 3   "by lowering the amount available on lump sum
          surrender"

Response: LifeUSA position is fundamental different.
          Termination policyholders that receive a lump
          sum surrender are receiving a reasonable rate of
          return.   The amount they are receiving has not
          been lowered in any way.

          Persisting policyholders are receiving a credit
          for the decreased disintermediation risk due to
          their selecting annuitization as their pay-out
          option.

          This is not a case of "semantics" - it is not
          the issue of "is the glass half full or half
          empty".

          A fundamental principle of doing business here
          at LifeUSA is provide good investment results to
          all our policyholders, and to credit
          policyholders that reduce our risks.   This is
          not the same business practice as "lower"
          amounts available on lump sum surrenders.   We
          believe many others in the industry approach
          business with the same high standards.

Page 4   "...others choose to ignore the cost of this risk
          [C-3 risk] or even the presence of this risk.   From
          a solvency perspective, this latter strategy is
          short-sighted".

          - and -

          "Thus, if there were rules that did not permit
          lower values to be paid on lump sum surrender than
          on annuitization, Regulators might be forcing those
          who annuitize to subsidize those who surrender."

Response: LifeUSA agrees with the above two statements.

          Our believe is equity and C-3 Risk management is
          best achieved by crediting two levels of

R.K. Wiard-Bauer's
Comments on Draft
Non-Forfeiture Report
November 24, 1992

       interest on annuities with cash surrender
       provisions. Establishing an arbitrary maximum
       difference between the accumulation value and
       the cash surrender value does not reflect proper
       actuarial risk assessment methods.

Page 5   "...should not establish procedures that would
       cause companies to limit the amounts of excess
       interest that they could pay."

Response: LifeUSA agrees that companies should determine
       amounts of excess interest that should be
       credited.

Page 5   "...should not establish procedures to limit the
       rewards to persistent policyholders....LHATF's
       objective should be to establish procedures for
       fairly distributing such benefits..."

Response: LifeUSA's position is fundamental actuarial
       principles should be defined for application by
       companies to their specific contracts.
       Artificially set limits should not be written
       into law.

Page 6   "...principal focus of any revision to the Annuity
       non-forfeiture Law should be to reduce the maximum
       divergence of account values and cash surrender
       values. ... we believe that these differences
       should be restricted to a fairly narrow range in
       order to preserve equity"

Response: Disagree. The purpose of non-forfeiture law
       should be that a terminating policyholder is
       adequately compensated for releasing the
       insurance company from the risks assumed under
       the contract. It is not to "reduce the maximum
       divergence of account values and cash surrender
       values".

       When an annuity contract is purchased, the
       policyholder is transferring investment and/or
       mortality risk to the insurance company in
       exchange for guarantees provided in the
       contract. The risks transferred are necessarily
       long term risks.

       Should an policyholder terminated the contract,
       as is their right, little advanced notice is
       required. This right of short term notification

has a cost that must be factored into the contract before it is issued by the insurance company.

For the policyholder continuing the contract into the annuity pay-out phase, a long term agreement continues and the risk of short term termination notification has been eliminated.

Any differences between the funds paid out to the terminating and persisting policyholders should be related to the cost of the short term notification right provided by the cash surrender provisions of the contract. This does not imply the "differences should be restricted to a fairly narrow range in order to preserve equity". Again, arbitrary, set limits should not be written into law. Arbitrary limits are not a substitute for actuarial assessment of risks.

Page 6, point #10 - 10% sales load limit

Response: What is this a percent of? The draft is not very specific

Page 7, point #C4. - Any ... other benefit available ... must be at least as great as the cash value (if any) and not greater than the account value.

Response: How does the present value of annuity payments get calculated for this comparison? Since annuitization present value calculations vary with different discounting interest rates, how would this point be applied? Should the guaranteed interest rate be used, a company's current interest rate, the valuation interest rate, or some other interest index?

Page 8, point #C7 - 5 year treasury bill

Response: This seems to be the actual bill rate, and not an average over time. Sharp interest rate increases or decrease could present risks that would better be measured by an time-weighted interest average.

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Page 8, point #C8 - "...greater of (a) the account value
        applied against the minimum annuity pay-out rate
        stated in the contract, or (b) the cash surrender
        value applied against the company's immediate
        annuity pay-out rates..."

Response: I'm not sure what this section is intended to
            do. No additional "rights" seem to be provided.

            I believe the minimum annuity pay-out rate is a
            contract guarantee, so it is already available.

            Also, since a policyholder could always take the
            cash value and purchase an immediate annuity, no
            additional "rights" seem to be provided here
            either.

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April 1, 1993

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cc: Mr. Ted Becker, ASA, MAAA
       Mr. Howard Kayton, FSA, MAAA, FCAS, FCA
       Mr. Anthony T. Spano, FSA, MAAA, EA
       Ms. Jean Olson

Dear Mr. Montgomery,

I'm responding to the release for public comment of the Report of
Advisory Committee on Revision of Annuity Non-Forfeiture Law
(December 15, 1992 revision).

The Committee's report contains a very good and useful
introduction and general comments on the background of annuities.
It identifies an important requirement of preserving equity
between surrendering and persisting policyholders.

However, the Committee's report then appears to proceed to
conclusions without identifying the problems it is trying to
solve or sharing the foundation for their conclusions. This
makes it difficult to evaluate the effectiveness or impact of the
proposed product design restrictions.

Perhaps part of the problem could be that the Committee did not
have a representative that is familiar with how a two-tier
annuity functions. If so, I would be happy to volunteer to serve
on the Committee and could probably find others also willing to
volunteer.

I have identified below five areas where I believe the solutions
in the Committee's report seem inconsistent with the Committee's
goals.

To assist the Committee, attached is an analysis I completed of
these areas titled "Equity, Two-Tier Annuity Product Design and

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Issues Facing Regulators." It defines equity based on a yield
curve approach and demonstrates how equity is met with
traditional and two-tier annuity product designs. Only basic
actuarial concepts and simple mathematics are utilized. My
research demonstrates equity is _preserved_ between policyholders
electing the cash value and those electing annuitization benefits
when a 20% or more annuitization bonus is guaranteed. It also
shows how two-tier annuities provide better benefit guarantees as
well as providing solutions to many of the issues facing
regulators today. Hopefully the Committee can benefit from my
analysis.

Please note that this analysis only looks at differences in
benefit amounts supported by the yield curve. There are other
justifications for differences in benefit amounts, such as
expense recovery, capital requirements and disintermediation
risk. These should also be analyzed by the Committee before
placing strict limits on product design for the sake of equity.

I have also attached a copy of my November 25, 1992 letter to Mr.
Howard Kayton regarding the Committee's November, 1992 draft
report. It contains a number of issues that are not repeated
here but remain valid for the final report. Since I don't
believe that my November 25, 1992 comments were included in any
of the monthly NAIC mailings, I have included a copy of the work
for distribution.

Basic Issues Requiring Further Research

1. Equity Definition and Demonstration

Equity should be defined and demonstrated in order to
understand the impact of restrictions on the relationship
between the cash value and account value.

My analysis indicates that large annuitization bonuses (20%
or more) are more equitable tool for guaranteeing long term
annuitization interest earnings to policyholders than the
benefits provided by a traditional product design. My
research carefully approaches the issue to make sure that
the demonstrated bonus level represents only the amount
determined to be equitable under the yield curve definition
of equity.

With respect to the Committee's report, personal
conversations by myself and others with committee members
indicates that research was not conducted in this area.

The suggested 90% ratio limitation was based on the current
Annuity SNFL front end load limits and the Committee's
desire that front-end load and back-end loads should be
equal. While equating front end and back end loads is a
laudable goal, it incorrectly assumes that the loss of an
annuitization bonus is a surrender charge for a
policyholder that elects a cash value benefit. In reality,
such bonuses serve policyholder equity by crediting long
term interest as a lump sum bonus to the account value.

In the current Non-forfeiture Law, the allowable expense
charge limit was designed with respect to the recovery of
acquisition costs. It was not intended to measure equity
between policyholders that invested long term and those
that invested short term. It is appropriate to use the 90%
limit for acquisition costs, but to hold it up as a
universal definition of equity is inequitable.

Currently, the Committee's report leaves open the question
of how does "...limit[ing] the maximum divergence of
account values and cash values....preserve equity[?]"
(page 6 of the report)

2. **Equitable Guaranteed Values**

My research report shows that crediting a lump-sum interest
bonus guarantees the same equitable level of benefits
annuity and cash value options.

Restricting product design to the proposed 90% limit would
prevent equitable treatment in benefit guarantees. It
would discriminates against annuitizing policyholders.

Any basic research completed by the Committee must consider
if consumers are protected by the proposed 90% limit, and
how equity could be re-established after the proposed limit
eliminated equitable guaranteeing of benefits.

3. **Policyholder Disclosure**

Long term interest rates are higher than short term rates
(with the rare exception of an inverted yield curve).
Longer term interest rates can only be earned on behalf of
policyholders when an insurance company is able to invest
in longer term securities. This investment strategy
requires long term, stable liabilities. By disclosing the
value of long term investments and securing the cooperating
of the consumer, higher earnings can be credited. Such
disclosure of the value of long term investments is in the
best interests of the consumer.

The two-tier product design uses a large bonus annuitization to credit and disclose the value of the long term investments. Again, the attached analysis demonstrates that disclosure can be achieved through an equitably determined bonus of 20% or more.

Any proposed changes to the Annuity Standard Non-Forfeiture Law should consider the consequences of restricting a means of proper disclosure. At this point, the proposed 90% ratio limitation serves to limit policyholder disclosure without identifying how disclosure can be accomplished using other means.

4. **Disintermediation Risk Management**

Disintermediation risk management is critical in the current dynamic and volatile interest rate environment. The attached analysis identifies how a large bonus provides risk management tools while preserving policyholder equity. Restricting such bonuses restricts disintermediation risk management. This is detrimental to the consumer because it increases the threat of insolvency and decreases the level of benefits that can be provided under an annuity contract.

Other than reducing the value of benefits, how will companies manage disintermediation risk if the two-tier product design is eliminated? Basic research in this area would enhance any recommendations from the Committee.

5. **Elimination of Policy Loans**

The Committee has proposed that policy loans should not be allowed for two of the three new product category definitions (No Cash Value Annuity and Restricted Surrender Provision Annuity). If adopted, this proposal would eliminate a policyholder benefit.

How are the consumer's best interests served by eliminating this benefit? The annuities have an actuarially determinable value. As such, they can act as collateral for a loan. One assumes that a third party (a bank) could use an annuity as collateral for a loan, or that a policyholder could sell their annuity to another owner. Yet the Committee's Report proposes that such a relationship should not be allowed between the insurance company and policyholder. What is the purpose of a limitation that restricts the relationship of an insurance company and policyholder, but allows similar relationships to exist with other parties?

Closing Comments

I believe the impact of the Committee's recommendations can only be fully understood if the above basic research is conducted and published. My attached analysis does this on a limited basis. Until the research on the proposed product design restrictions is completed, one cannot determine if the "solutions" recommended are solutions at all, let alone see if they achieve the objectives of the Standard Non-Forfeiture Law.

Hopefully my comments and analysis will help improve the work begun by the Advisory Committee on Revision of Annuity Nonforfeiture Law. With the completion and publication of the fundamental research, I believe necessary, meaningful and equitable changes can be made to the Standard Non-Forfeiture Law.

I am available to answer questions or discuss additional analysis that could be completed. Also, if needed, I would welcome an opportunity to serve on the committee.

Thank you for your time and the opportunity to respond to the Committee's report.

Sincerely,

Roger K. Wiard-Bauer, FSA, MAAA
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Equity,
Two-Tier Annuity Product Design
and
Issues Facing Regulators

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	Equity, Two-Tier Annuity Product Design, and Issues Facing Regulators R.K. Wiard-Bauer, LifeUSA April 1, 1993	Report of Advisory Committee on Revision of Annuity Non-Forfeiture Law Kayton Committee December 15, 1992
1. Equity	Equity defined and demonstrated using a yield curve approach. Demonstrations show equity is preserved through a two-tier product design with a 20% or more bonus.	Equity is not defined or demonstrated. An assumption is made that limiting the ratio of cash value to account value to a narrow range is equitable. A 90% ratio is proposed.
2. Benefit Guarantees	Demonstrates how a 20% annuitization bonus is necessary to guarantee equitable annuitization payments for persisting policyholders	Does not consider the impact of the proposed 90% ratio on equity between policyholders electing cash value benefits or annuitization benefits.
3. Disclosure	Identfies how a 20% annuitization bonus properly discloses to the policyholder the true value of the longer duration assets.	Does not consider disclosure to the policyholder.
4. Disintermediation Risk Management	Demonstrates that disintermediation risk managment tools are built-in to a two-tier product design.	Suggests disintermediation risk management is important, but does not consider how the proposed 90% ratio limits risk management, or what other risk management tools are available.
5. Surrender Changes	Identifies that in absence of any surrender charges a 20% or more annuitization bonus is required to preserve equity.	Assumes any difference between cash values and account values is a surrender change.

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Introduction

In annuity product design, equity between terminating and persisting policyholders is a critical issue. Other issues being discussed in today's regulatory environment include policyholder disclosure, product guarantees (including "guaranteeing" traditionally non-guaranteed elements), reserve adequacy, and disintermediation risk controls.

The report defines equity and demonstrates how equity is met with traditional and two-tier annuity product designs. It also shows how a two-tier annuity product design provides solutions to many of the issues facing regulators today.

Let's explore the concept of equity and product design. The focus will be on payments actually received by a policyholder.

Yield Curve Definition of Equity

All payments (either the lump sum cash value or the annual annuity pay out) earn exactly the interest rate specified by the yield curve for the period between investment and dispursement.

A yield curve (by definition) is the market's rate of return for the duration of the investment. It is the financial world's definition of what is an equitable return for funds invested over different time periods.

The sample yield curve used for this report's calculations is shown to the right. It is based on approximate yields over the past decade. The concepts shown in this report are also valid for today's lower interest rate environment.

Since terminating and persisting policyholders receive disbursements at different times, equity can only be preserved if a product design satisfies a yield curve definition of equity.

Yield Curve
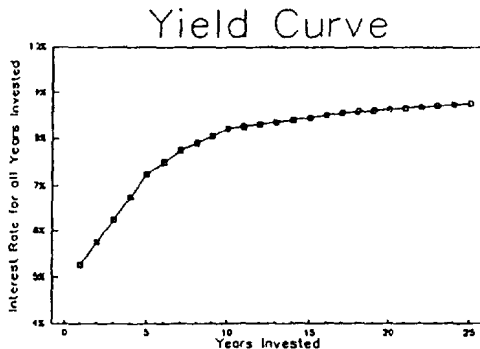
Sample Product Design for a SPDA:

The following product design will be the foundation for both a traditional and two-tier single premium deferred annuity (SPDA). Specific differences between the two product types will be defined later in this report.

A policyholder may elect to receive a lump-sum cash value or a 10 year certain annuity-due. The guaranteed settlement interest rate is 3%. Annuitization can occur anytime at or after the first policy anniversary. Payments to be received (lump-sum or annually) are based on the yield curve available at the time of sale (illustrated above).

Initial expenses are removed at issue for all policyholders. Thus, there are no timing considerations necessary for initial expense recovery. Initial expenses are assumed to be 10% of the single premium (the maximum load for SPDA under the current Annuity Standard Non-Forfeiture Law).

Sample values to be used in demonstration calculations:

Single Premium:	$1000
Initial Expenses:	$100
Initial Funds Available for Investment:	$900

Calculation of Cash Value and Annuity Payments

The benefits provided under the sample SPDA are either a lump-sum cash value or annual payments for 10 years. (For the annual payments, the yield curve approach focuses the calculation directly on determining the equitable annual payment amount without using an account value. The usual approach is to start with an account value and then derive appropriate annuity payments. Account values will be calculated later in this report.)

The cash values are calculated as follows:

Example #1: Termination after 1 Year
    Initial Funds Invested: $900
    Yield Curve Interest Rate
        for a 1 Year Investment: 5.25%
    Cash Value at End of Year 1:
        $900 * (1.0525)^1 = $947

Example #2: Termination after 10 Years
    Initial Funds Invested: $900
    Yield Curve Interest Rate
        for a 10 Year Investment: 8.20%
    Cash Value at End of Year 10:
        $900 * (1.0820)^{10} = $1,979

The equitable level of annuity payments for a 10 year certain annuity-due with an initial investment of $900 are calculated as follows:

599

Example #3: Annuitization after 1 Year
  Yield Curve Interest Rates:

Year	Rate	Year	Rate
1	5.25%	6	7.50%
2	5.75%	7	7.75%
3	6.25%	8	7.90%
4	6.75%	9	8.05%
5	7.25%	10	8.20%

Annuity-Due Factor: 6.891
    (Present Value of $1 Per Year at the
    Above Interest Rates)
    $(= (1.0525)^1 + (1.0575)^2 + \ldots + (1.0820)^{10})$

Annual Payment (Beginning of Years 2-10): $131

Example #4: Annuitization after 10 Years

  Yield Curve Interest Rates:

| Year	Rate	Year	Rate
10	8.20%	15	8.45%
11	8.25%	16	8.50%
12	8.30%	17	8.55%
13	8.35%	18	8.57%
14	8.40%	19	8.60%

Annuity-Due Factor: 3.184
    (Present Value of $1 Per Year at the
    Above Interest Rates)
    $(= (1.0820)^{10} + (1.0825)^{11} + \ldots + (1.0860)^{19})$

Annual Payment (Beginning of Years 11-20): $283

The graph below shows the cash values and 10-year certain annuity-
due payments for 15 years. The values are the amounts that would
be received based on the yield curve definition of equity.

For example, in year 5, a
policyholder would have a
choice to receive a lump sum
of $1,277, annual payments of
$183 per year for 10 years,
or continue the policy in
deferral.

Although the equitable annual
payments have been
calculated, they cannot be
directly compared to the cash
value without a present value
calculation.

Cash Values and Annual Payments

—•— Cash Value   —•— Annual Payment
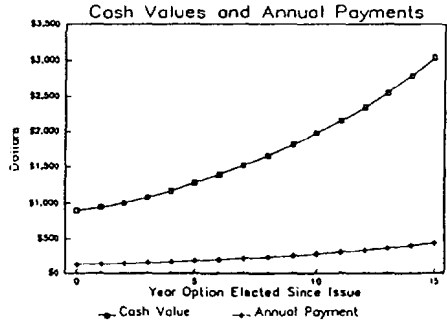
Calculation of the Present Value of Annual Payments

The formula used in calculating the present value of annual payments is:

      Account Value
            = Present Value of Annual Payments
            = Pay Out Annuity-Due Factor * Annual Payment

The Present Value of Annual Payments is often called the Annuitization Value or Account Value in a two-tiered annuity.

Our sample yield curve has already provided the equitable annual payment levels. Now the question becomes how to calculate the present value. This depends on the interest rate assumption for the Pay Out Annuity-Due Factor. Listed below are two examples at different interest rates.

   Example #5 - Pay out Interest Rate of 7.25%

      Pay Out Annuity-Due
       for an Interest Rate of 7.25%:   7.447

                              Year 1:   Year 10:
         Annual Payments $131 $283
         Account Value $973 $2,105
         Cash Value $947 $1,979
         Ratio of Account Value
            and Cash Value   102.67%   106.34%


   Example #6 - Pay out Interest Rate of 3.00%

      Pay Out Annuity-Due
       for an Interest Rate of 3.00%:   8.786
                              Year 1:   Year 10:
         Annual Payments $131 $283
         Account Value $1,148 $2,484
         Cash Value $947 $1,979
         Ratio of Account Value
            and Cash Value   121.14%   125.47%

Notice the substantial difference in account values. For an interest rate of 7.25%, the year 10 account value is $2,105. For a 3.00% interest rate, it is $2,484, or 18% higher. Also notice the ratios of the account values to the cash values. For 7.25%, the year 10 ratio is 106.34%. For 3.00%, the ratio is 125.47%.

The graph below shows the ratio of the Account Values to the Cash Value for six different pay out interest rates.

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Ratio of Account Value to Cash Value
For Various Pay Out Interest Rates

Years Since Policy Issue

─□─ 7.25% ─◇─ 6.50% ─△─ 5.75% ─✕─ 5.00% ─+─ 4.00% ─⊥─ 3.00%
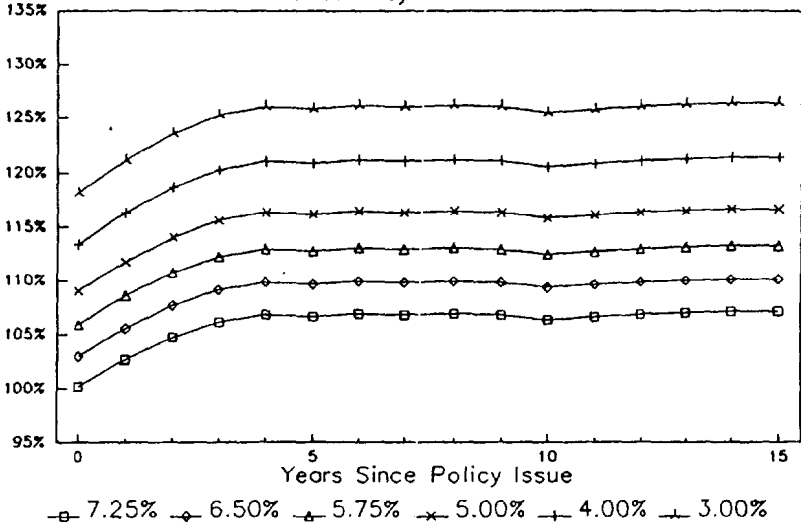
Please note that the same cash values and annual payments are used for all account values calculated with various pay out interest rates. In other words, the account value levels used in the above ratios all reproduce the equitable annual payments when the stated pay out interest rates are used.

The only differences between the lines in the above graph are how the value is shifted between the Account Value and the Annuity-Due factor. (Think of it as a long, narrow balloon being held in the middle. By squeezing one end, the other end gets larger but the amount of air in the balloon stays the same. In the annuity calculations, the Account Value and Annuity-Due factor are the two ends of the balloon, and the volume of air is the payment level).

A traditional annuity product design uses the Account Value equal to the Cash Value, which in the sample calculations requires a pay out interest rate of about 7.25%. (This is the bottom line in the previous graph.)

For the sample SPDA two-tier annuity product design, let's use the highest account value, which is based on the guaranteed settlement interest rate of 3%. (In the previous graph, this is the top line.) This is equivalent to declaring a 21% annuitization bonus at issue. In order to keep the annual payment levels at the equitable level, a slightly higher interest rate will need to be credited to the Account Value compared to the Cash Value or a slightly higher pay out interest rate.

Since each set of Account Values and Annuity-Due factors produce
exactly the same level of annual payments, there is NO
discrimination between terminating and persisting policyholders
from the higher account values in the illustrated two-tier product
design.

Even though the two-tier pay out interest rate is significantly
lower than the traditional policy design interest rate, the actual
annual payments provided to a policyholder are the same and are
equitable based on the yield-curve definition of equity.

**Benefit Guarantees - Comparison of Traditional and Two-Tier
Product Designs**

Now that we have defined the Cash Value and an Account Value,
let's focus on how the traditional product design and two-tier
product design function with respect to product guarantees.

For cash values, both product designs have the same guarantee and
function identically.

For the account value both product designs guarantee a 3% pay out
interest rate.

The two-tier product design has guaranteed a higher account value
to which the annuity pay out factor is applied. By crediting a
"bonus" up-front, the two-tier product has guaranteed that a
policyholder will receive equitable annual payments. This "bonus"
serves to "vest" the policyholder in the higher long-term interest
rates supporting the annual payments.

In the traditional product design, the actual payment level can be
manipulated through decreasing the pay out interest rate. This is
to the detriment of continuing policyholders and may result in
unfair discrimination against continuing policyholders. If the
pay out interest rate is dropped to the guaranteed level, a
policyholder receives only 93.4% of the equitable annual payment.

Shown to the right is a
comparison of the guaranteed
annual payments using the
traditional annuity product
design and the two-tier
annuity product design.

The two-tier product design
guarantees higher annual
payments at all durations.

Guaranteed Annual Payments

— Traditional Design   — Two-Tier Design

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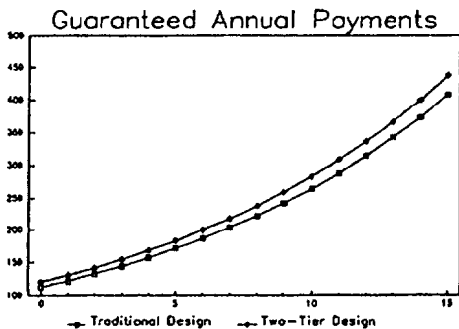
**Policyholder Disclosure of the Value of the Higher Long Term
Interest Rates**

By guaranteeing the higher long-term interest rates through an
annuitization bonus, the policyholder has information disclosing
the full value of the long-term investment of assets.

In contrast, a traditional product design fails to disclose the
true value of long duration investments, or that the guaranteed
annual payment levels are below the equitable levels defined by
the yield curve definition of equity.

**Deferral Status Reserve Comparisons of Traditional Product Design
and Two-Tier Product Design**

Because the two-tier product
design guarantees the
equitable annual payments, it
has a higher CARVM reserve
than the traditional product
design.

The graph to the right shows
the ratio of each product
design's CARVM reserves to
the cash value. A valuation
interest rate of 8.25% was
used.

Comparison of Traditional and Two-Tier Product Design
Ratio of CARVM Reserve to Cash Value
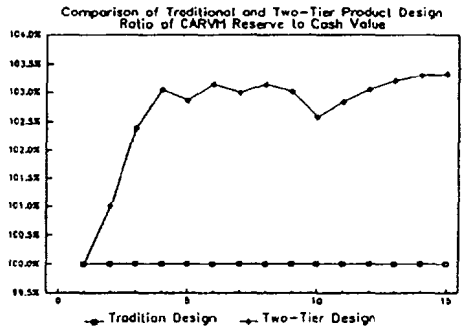
**Disintermediation Risk Management - Comparison of Traditional and
Two-Tier Product Designs**

A two-tiered annuity employs disintermediation risk control in two
ways: through policyholder disclosure and higher CARVM reserves.

Since the higher account value properly discloses the full value
of the annuitization benefits, the policyholder's decision to
receive the cash value lump sum is properly weighed against the
loss of the longer term annual payments. This properly provides
incentive for the policyholder to continue the original contract.
Also, since more policies annuitize and spread payments over
longer periods, cash flow management is more stable. This valid
argument has been the traditional justification given for two-
tiered annuities.

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In addition, through the CARVM reserve process, the present value of the annuitization payments are larger than the present value of cash value benefits. This higher reserve provides a "cushion" should a policyholder elect to receive the cash value. This is a direct result of the guaranteed pay out interest rates being very close to the actual pay out interest rates.

Contrast this to a traditional policy. Since the policyholder is not informed of the higher annuitization value, they cannot make an informed decision and, through ignorance, will terminate a policy with very valuable annuity benefits (assuming the insurance company that wrote the traditional policy was willing to provide the equitable annual payments). Furthermore, small or vanishing surrender charges do not discourage contract termination. They only help recover issue expenses.

For a traditional product design, the CARVM reserves often equal the cash surrender value. The reserve calculation for annuity benefits is based on the artifical combination of the low cash value, the minimum guaranteed settlement interest rate, and a "real" (high) valuation interest rate to discount liabilities. This approach fails to take into account the actual high asset yields for the annual payments. (This situation can be corrected by crediting an appropriate bonus to the account value (the two-tier approach), by using current pay out annuity factors for reserves, or by using valuation interest rates at about the same level as the guaranteed interest rates.) Since the traditional product design produces reserves that are much lower than a two-tier product design, the traditional design lacks a cushion (or market value adjustment) for disintermediation.

Solutions to Regulatory Issues Provided by the Advantages of a Two-Tier Product Design

Regulators are currently facing many issues related to annuities. Using our sample two-tier and traditional product designs, let's review the advantanges provided by the two-tier annuity in solving many of these issues.

1. Equity

    Equity is preserved through the use of a two-tier product design. It provides for an up-front bonus. This means the payment level cannot be dropped below the equitable payment level defined by the yield curve. A traditional annuity product design fails to treat fairly policyholders that annuitize.

2. **Benefit Guarantees**

    By providing a bonus at issue, a two-tier annuity is "guaranteeing" the interest earned by longer duration assets – thus guaranteeing a traditionally non-guaranteed element.

The policyholder is immediately "vested" in the higher
returns to be earned by the longer duration assets. (Side
note: Failure to provide a bonus is to guarantee that
annuitizing policyholders have significant risk of being
treated inequitably. This is the approach taken with
traditional annuities.)

3. Disclosure

By providing a bonus, the two-tier annuity properly
discloses the true value of the longer duration assets.
Through disclosure, the policyholder can make a more
informed decision on considering the option of surrendering
for the cash value or annuitizing.

For policyholders that elect to annuitize within a few years
after issue, the settlement interest rate used will be
closer to the guaranteed rate. Since they have already
received the higher interest earnings as a lump-sum bonus,
such practice is not discriminatory.

However, if a traditional annuity uses a settlement interest
rate near the guaranteed rate, then discrimination can occur
against the annuitizing policyholders since they do not
receive a lump-sum interest bonus.

It is very important to note that the difference between the
two values, the cash value and the account value, is NOT a
surrender charge. It is a lump-sum guarantee of interest
earnings based on the yield curve definition of equity. It
preserves equity between terminating and persisting
policyholders.

4. Disintermediation Risk Management

A two-tier annuity discloses the true account value to a
policyholder, which results in deceased terminations. It
also increases the amount of annuitization over longer
periods, providing for a more stable cash flow. Finally, it
has a higher reserve which provides a "cushion" should a
policy surrender. The higher account value combined with
the higher reserves are a form of market value adjustment.

For a traditional product design, the policyholder is not
informed of the higher annuitization value and cannot make
an informed decision about the value of the annuitization
payments. The traditional small (or vanishing) surrender
charge does not serve as a deterrent to surrendering the
policy. It is not based in the public interest, but serves
only to help the insurance company recover issues expenses.
Traditional product design reserves are significantly lower
and do not provide any cushion for disintermediation.

Conclusion

What annuity product design provides the best guarantee for both the cash value and the annuitization payment level? How can a company disclose to policyholders in an easy to understand fashion the proper value of annual payments?

The answer: a two-tier annuity, given the yield curve definition of equity.

The crediting of an up-front bonus for annuitization results in:
- preservation of equity
- disclosure of the true value of the annuitzation benefits
- stronger benefit guarantees, and
- disintermediation risk controls.

All of these items are in the public's best interests. The two-tier product design has significant benefits to offer to consumers and regulators. It is both safe and equitable.

Public policy is not served by efforts to restrict the maximum divergence of account values and cash values. Such restrictions fail to preserve equity between terminating and annuitizing policyholders. The restrictions also fail to guarantee equitable annual payments. Keeping the two-tier annuity product design available in the marketplace is in the best interest of the public and the regulators.

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May 13, 1993

Mr. Howard Kayton
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Dear Howard,

Thank you for your interest in my Yield Curve Equity research. I enjoyed our discussions at the LHATF meeting in Los Angeles.

Correction to April 1, 1993 Report

In discussions with other actuaries, an error was uncovered on page 6 of my April 1, 1993 research report. In the comparison of guaranteed payment levels for traditional and two-tier product designs, my original report incorrectly stated the traditional product design guaranteed 93% of the equitable annuity payment level. In reality, the traditional design only guarantees 83% in the first year and 79% in year 15. I have attached a new graph to replace the "Guaranteed Annual Payments" graph on page 6 of my April 1, 1993 report (Attachment #1 is the incorrect graph and Attachment #2 is the corrected graph).

The corrected ratio of 83% to 79% strengthens my argument that traditional product designs have much weaker guarantees for annuitizing policyholders and that equitable treatment of all policyholders requires the use of an initial immediate annuitization interest bonus (the two-tier annuity).

My notes from the LA meeting indicated that you had two questions about the Yield Curve Equity research. I've given the items some thought and here is how I remember and perceive the issues:

Inverted Yield Curve

   Q: What happens under an inverted yield curve to the initial immediate annuitization interest bonus?

   A: The Yield Curve Equity approach is consumer based and is separate from the investment management activities the insurance company. As such, Yield Curve Equity reflects the "normal yield curve" principle and provides guidance for policyholder equity issues. It is not a direct reflection of insurance company investments or expense recovery. A better name for the policyholder equity yield curve might be "Retail Yield Curve".

With respect to inverted yield curves, my understanding is that they have occurred only for brief periods of time. They are important for insurance company investment management and cash flow testing, but do not change the public expectation that a positively sloping yield curve is "normal" for a consumer. Thus, I submit that only positive sloping yield curves are applicable for discussing equity.

However, to be complete, let's assume that the yield curve goes crazy and for the first time in human history takes an inverted shape for 25 years. Based on this assumption, I developed an inverted yield curve and projected out the equitable cash value and annuity payment levels.

Attachment #3 compares my original positive slope yield curve (April 1, 1993 report) and the inverted yield curve. I used the original positive sloped yield curve to develop the inverted yield curve. The year 1 interest rate was transferred to year 25, and year 25 interest rate became the year 1 rate. Then I used the negative of the change from year 1 to year 2 as the "slope" for the "inverted yield curve from year 1 to year 2. This "slope" method was used for all years.

Attachment #4 shows the ratios of the account values to the cash values for various pay out interest rates. For the inverted yield curve, a <u>minimum</u> 10% bonus is required to preserve equity when a 3% settlement interest rate is used. This is much lower than my original paper bonus of 20% to 25% since a radically different yield curve was used. HOWEVER, an important piece of information is gained. <u>The inverted yield curve required a bonus of 10% - it is the lowest possible bonus needed to preserve equity under the "worst case" yield curve. YET 10% is proposed as the maximum for the new Annuity Standard Non-Forfeiture Law - the maximum "best case" bonus to be allowed. This research shows the proposed 10% is too low to preserve equity even under the worst possible yield curve and that preserving equity requires bonuses greater than 10%.</u>

Consider the guaranteed payment levels under the inverted yield curve. The traditional product design only produces 89% to 93% of the equitable annual payments if the pay out interest rate was dropped to 3%. Since this has been accepted as "equitable" in the past, it would seem a 10% variation from the "equitable annual payment level" is acceptable under adverse economic conditions.

Now consider the two-tier product design. By crediting a 20% bonus, it has guaranteed payments 10% above the "equitable payment levels". This is still within the equity tolerance level that has been accepted under the traditional product design.

The conclusion is:

1) Under the worst case scenario for the two-tier product design (inverted yield curve) is as good at preserving equity as the traditional product design. The 10% too high of bonus is still within the equity tolerance range accepted for a traditional annuity design.

2) Under the "normal" positively sloping yield curve in my April 1, 1993 report, the crediting of a 20% to 25% bonus was necessary to preserve equity. The two-tier product design was successful at preventing discrimination. However, the traditional product design, as stated in the corrections above, allow payments 20% below the "equitable payment level". The traditional design failed to prevent discrimination.

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Again, one can only conclude the two-tier design with a 20% to 25% bonus is better at preserving equity, disclosing the value of long term investments and providing stronger guarantees than a traditional product design.

Use of Current Pay Out Interest Rates in a Two-Tier Product Design

Q: What happens if the current pay out interest rates are used for a two-tier product design?

A: Let's return to the original positive sloping yield curve in the April 1, 1993 research paper.

Restating the question: What "current" pay out interest rate can be credited and still preserve equity between policyholders electing the cash value option and those electing annuity payments?

Let's review actual pricing (asset share) calculation to see the impact of the yield curve, investment margins and duration, and surplus requirements. (Another important factor is initial expense amortization, but I'm simplifying my analysis by removing all initial expenses at issue).

Furthermore, assume that "equity in pricing" is satisfied if the insurance company has the same internal rate of return at issue for policyholders that elect cash value benefits and those that elect annuitization benefits.

After much thought, I decided the concepts can best be demonstrated by considering two separate pricing (asset share) calculations. This will help demonstrate the differences in investment results and help us identify to whom the additional funds belong.

The logic flows as follows:

1. For the traditional (cash value) product design, calculate "equitable" cash values and determine the management practices necessary for the product design. This includes the investment margin, surplus requirements, the investment portfolio durations, and the required profitability levels.

   Attachment #5, shows a pricing (asset share) calculation for a "traditional" product design. In managing the product, investments are made to support all policies electing the cash value option. (In real life, should a policyholder with such a product elect an annuity benefit, the lump sum cash value is used to buy new assets and a "current" credited rate applied. The process requires a cashing out of funds and purchasing new investments to support the annuity payments).

2. For the two-tier (annuitization) product design, use the same equitable cash values and use the equitable bonus level (20%) for annuitization. Then determine the appropriate (and different) management practices to support the two-tier product design. This includes the investment margin, surplus requirements (deferral and pay out), the investment portfolio durations, the required profitability levels. Based on the management practices, identify the

additional "value" created by the different management practices required for a two-tier (annuitization) product.

Attachment #6, shows a two-tier product design with a annuitization benefits of a ten year certain annuity due. A 20% annuitization bonus is used. In managing the product, assets with longer durations can be purchased since funds will be invested about 5 years longer. We know from the yield curve that a higher interest rate will be earned during all years of the contract - including the deferral years. In this product, when annuitization is elected, no assets are cashed out. Instead, the same long term investments are slowly liquidated to provide for annuity payments. (In real life, an insurance company managing a two-tier product would have some assets invested in short durations to provide funds to policyholders electing the cash value. These policyholders would receive cash values like those shown for the traditional (cash value) product discussed above).

3. To whom does this extra "value" belong?

Comparing Attachments #5 (column j) and #6 (column n), the two-tier (annuitizing) product design has significantly higher Reserve Interest Margins due to the longer duration investments and the crediting of the "cash value product interest rates to the account value.

Since the additional "value" occur due to product design features of the annuitization bonus, all the extra "value" must be returned to annuitizing policyholders that elect the benefits that produce the extra "value". The "value" is created from the yield curve providing higher returns for longer duration investments, and due to the lower surplus requirements during pay out. It needs to be "held" for crediting to the annuitization benefits. Attachment #6 holds a deferral reserve higher than the account value to "hold" some of the extra investment income. The rest is allowed to flow through the column r (gain from operation) to be held in general surplus for later funding of the strain for the increase in reserve. (Please note that the general surplus is different from the required surplus shown in the calculation.)

Why shouldn't it be credited to the account value? To do so would violate the contribution principle. The higher investment earnings are only due to the policyholder agreeing to elect annuitization benefits, which changes the investment management options of the insurance company. If it was credited to the cash value (or if the traditional (cash value) product had longer duration investments), there is a significant cash flow mis-match between liabilities and assets. This would be a unsound management practice that would result in insolvency.

4. To return the extra "value" to the annuitizing policyholders under the two-tier design, we need to determine the correct "current" pay out interest rate. This requires keeping insurance company profits "equal" between the two product designs (as measured by the internal rate of return method).

For the calculations completed in Attachment #6, a "current" pay out interest rate of 4.68% would return the extra value to the annuitizing two-tier policyholder. This is 1.68% higher than the guaranteed interest rate of 3%.

Attachment #7 contains a number of graphs summarizing values for many different "annuitization" election dates. The "Yield Curves" graph shows the "Retail Yield Curve" credited to the cash value option, and the investment earnings of the insurance company for the assets backing the cash value or annuitization policies. (Please note that the April 1, 1993 work used the yield curve rates slightly differently from this analysis. This does not impact the concepts demonstrated). The "Profitability Comparison" graph compares the traditional and two-tier product IRR's for various years when the cash value or annuitization is elected. The "Pay Out Interest Rates" graph shows how the "equitable current interest rates" vary by election year. Notice how it has a positive yield curve slope. Finally, some of the key data assumptions are shown in the lower right hand corner.

It is interesting to note that the traditional and two-tier annuity designs both treat all policyholders equitably.

Managing the traditional product requires more liquidity and "reinvests" the cash value amount when someone annuitizes. Care must be taken to avoid investing too long least interest rates increase and a "run on the bank" occurs.

Managing the two-tier annuity requires providing an incentive for policyholders to chose annuitization, which allows longer term investments (funding the incentive) which generates additional investment earnings during the deferral and pay out periods, which the contribution principle requires to be applied ONLY to the annuitization benefits, which funds the use of current interest pay out interest rates for annuitizing policyholders. This also insulates the insurance company from disintermediation risk due to the higher level of annuitization. This decreases liquidity needs and costs, which (by the contribution principle) must be returned to annuitizing policyholders.

Managing a two-tier product requires more thought to identify and credit the additional earnings to the proper policyholders, but it provides rich rewards in the form of higher annuity benefits for the policyholders that use their annuities for the intended purpose (an income stream). Better returns, stronger guarantees, better disclosure, equitable cash values and emergency access to funds are strong advantages to a two-tier annuity product design. These strengths are not available with traditional policies or market value adjusted annuities. Consumers should have a chance to make a decision and purchase the product they believe best meets their needs. The two-tier product design should be available to the public, especially since equity has been demonstrated in this research.

To summarize, the pricing (asset share) calculations establishes that Full Pricing Equity requires a two-tier product design with a 20% to 25% bonus and a current interest rate. It is required when all interest earrings, benefit guarantees, expense, surplus and profit considerations follow equity concepts.

My research continues to demonstrate that equity would be prevented through imposing a narrow range between cash values and account values as is proposed for the Annuity Standard Non-Forfeiture Law.

Conclusion

I have a theory on why the "two-tier" issue is causing so much discuss:
treatment of policyholders.

Traditional asset share work credits the same earned interest rate is to ɛ
"average" portfolio rate. For annuities, this approach was sufficient w
investments earn close to the same interest rate and when pay out guarɛ
same level as the earned interest rate. This was the environment when
developed asset share formulas and it was a reasonable approximation t
the approach still presented in the actuarial exams.

In the 1970 and early 1980's, a dynamic interest environment develope
widely available and more complex product designs became possible (li
insurance). The two-tier annuity was also created.

Today the challenge to the actuarial profession is to update the asset shɛ
the contribution principle with a new definition of equity based on yielc
that reflects dynamic interest rates, more advanced surplus allocation th
return definitions (like internal rates of return). The numeric calculatio
trying to help achieve this goal.

Thank you for your time and I look forward to hearing your thoughts o:
questions. I look forward to further discussions and research.

Sincerely,

Roger K. Wiard-Bauer, FSA, MAAA
Product Actuary
(612) 525-6428
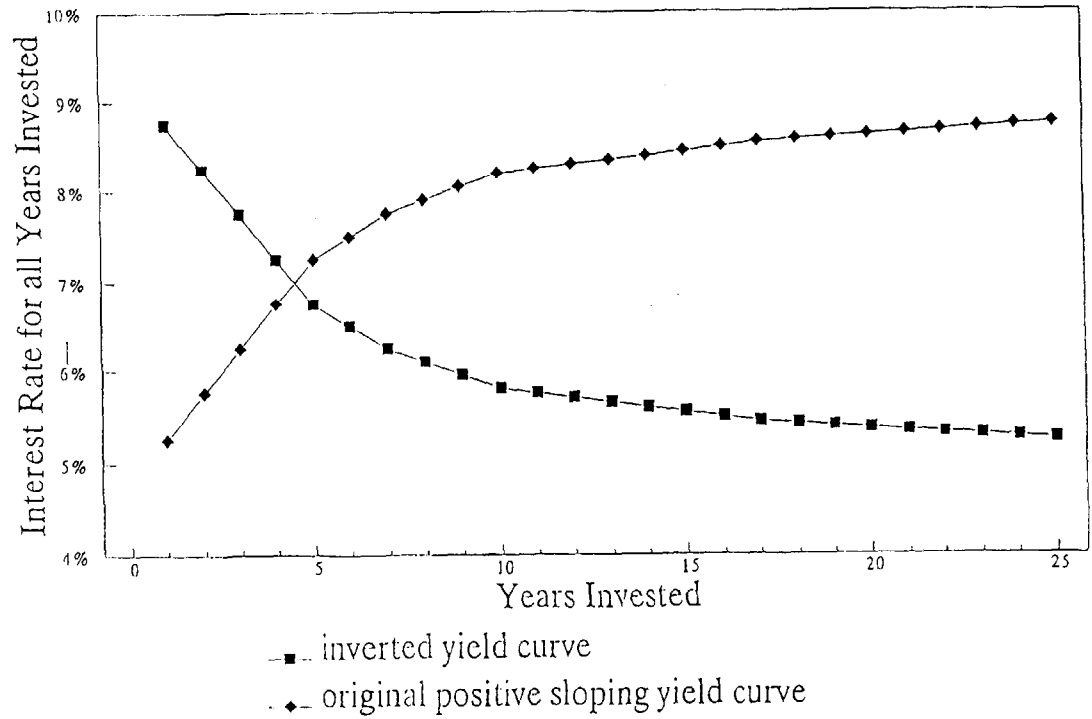
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Corrected Graph — Guaranteed Annual Payments

Traditional Design — Two-Tier Design

Yield Curve

Based on an Inverted Yield Curve

Ratio of Account Value to Cash Value
For Various Pay Out Interest Rates

Years Since Policy Issue

$\blacksquare$ 7.25% $\blacklozenge$ 6.50% $\blacktriangleright$ 5.75% $\square$ 5.00% $\diamond$ 4.00% $\triangleright$ 3.00%
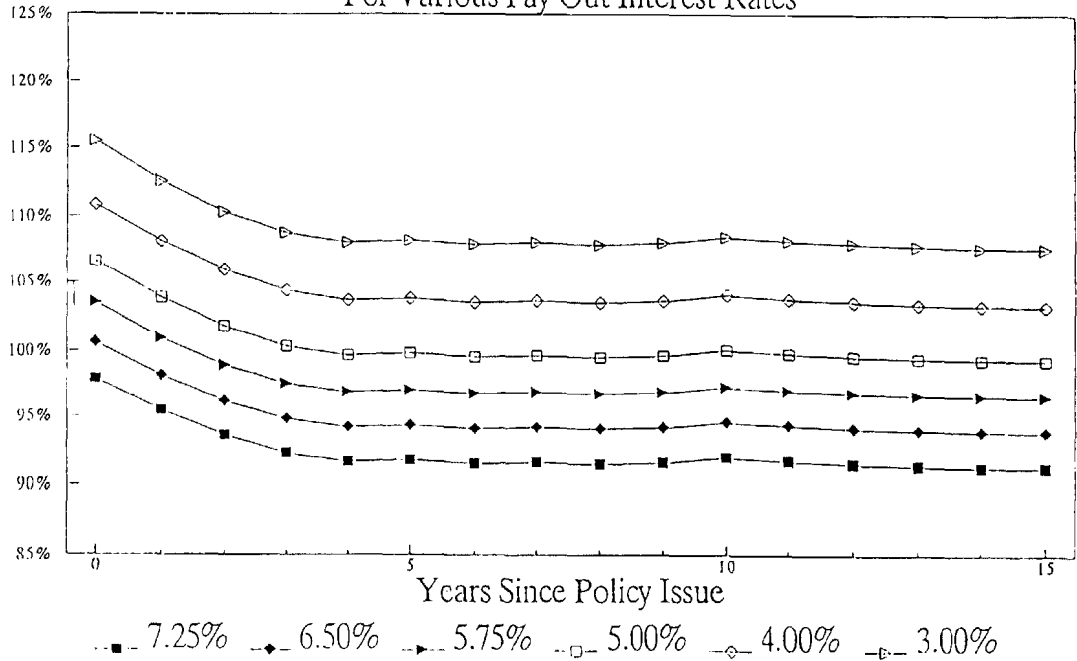
IRR Sample Calculation

Attachment #5
R.K. Wiard – Bauer
May 13, 1993

Traditional Product Design – Cash Value Option Elected in Year 5

Year	Premium	Initial Expense	BOY Account Balance	Credited Interest Rate	Interest Credited	EOY Balance	Required Surplus Factor	BOY Surplus	Change in Surplus	Reserve Interest Margin	Surplus Interest Margin	Interest Income	Expense	Gain From Operations	Cash Flow
	a	b	$c=f(-1)$	d	$o=c \cdot d$	$f(1)=n-b$ $f=d+o$	g	$h=c \cdot g$	$i=h-h(-1)$	j	$k=d+j$	$l=$ $c \cdot j + h \cdot k$	m	$n=l-m$	$o=-i+n$
0	10,000	1,000				9,000	7.25%		653						(653)
1			9,000	5.75%	518	9,518	7.25%	653	38	0.90%	6.65%	124	50	74	37
2			9,518	6.25%	595	10,112	7.25%	690	43	0.87%	7.12%	132	50	82	39
3			10.112	6.75%	683	10,795	7.25%	733	49	0.84%	7.59%	141	50	91	41
4			10,795	7.25%	783	11,578	7.25%	783	57	0.81%	8.06%	151	50	101	44
5			11,578	7.50%	868	12,446	7.25%	839	(839)	0.79%	8.29%	161	50	111	950

Cash Flow IRR =   12.30%

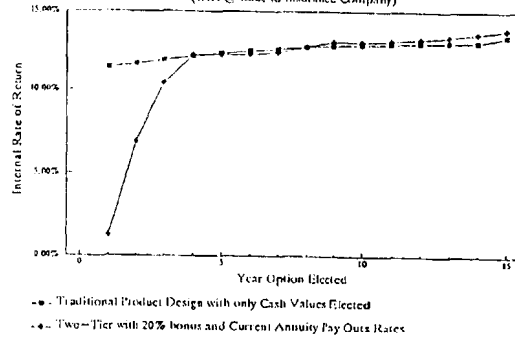# IRR Sample Calculation

Attachment #6
R.K. Wiard-Bauer
May 13, 1993

Two-Tier Product Design – Annuitization Option Elected in Year 5

Current Pay Out Interest Rate = 4.68%
Valuation Interest Rate = 7.25%
Deferral Reserve Strain = (Reserve – Reserve(–1)) – (Account Balance – Account Balance(–1))
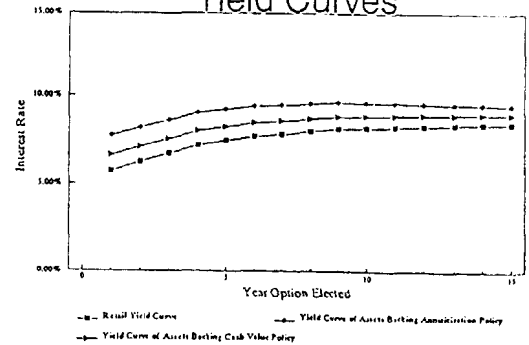Pay Out Reserve Release = (Reserve(–1) – Payment) * (1+Interest Margin Surplus) – Reserve

Year	Prem	Initial Expense	BOY Credited Account Balance	Credited Rate	Interest Credited	EOY Balance	Deferral Reserve	Pay Out Reserve	Payment (BOY)	Res Strain (release)	Required Surplus Factor	EOY Surplus	Change in Surplus	Reserve Interest Margin	Surplus Interest Margin	Interest Income	Expenses	Gain From Operations	Cash Flow
	a	b	$c=f(-1)$	d	$e=c \cdot d$	$f(1)=a+e-b$ $f=d+e$	g	h	i	j	k	$l=g \cdot k(<5)$ $l=h \cdot k(>4)$	$m=1-i-l(-1)$	n	o	$p=g(-1) \cdot n$ $+k(-1) \cdot o$	q	$r=-f+p-q$ $-f+p-q$	$s=m+r$
0	10,000	1,000				9,000	9,153			153	7.25%	664	664					(153)	(817)
1			9,000	5.75%	518	9,518	9,680			9	7.25%	702	38	2.05%	7.80%	239	50	181	142
2			9,518	6.25%	595	10,112	10,285			10	7.25%	746	44	1.97%	8.22%	249	50	189	145
3			10,112	6.75%	683	10,795	10,979			12	7.25%	796	50	1.90%	8.65%	260	50	198	148
4			10,795	7.25%	783	11,578	11,775			13	7.25%	854	58	1.82%	9.08%	273	50	209	152
5			11,578	7.50%	868	12,446	12,658	13,546		903	5.75%	779	(75)	1.75%	9.25%	285	50	(658)	(593)
6								12,577	1,819	(235)	5.75%	723	(56)		9.25%	72	50	257	312
7								11,538	1,819	(215)	5.75%	663	(60)		9.25%	67	50	232	292
8								10,423	1,819	(185)	5.75%	590	(54)		9.25%	61	50	206	270
9								9,228	1,819	(172)	5.75%	531	(69)		9.25%	55	50	178	246
10								7,946	1,819	(148)	5.75%	457	(74)		9.25%	49	50	147	221
11								6,571	1,819	(123)	5.75%	378	(79)		9.25%	42	50	115	194
12								5,097	1,819	(95)	5.75%	293	(85)		9.25%	35	50	80	165
13								3,515	1,819	(66)	5.75%	202	(91)		9.25%	27	50	43	134
14								1,819	1,819	(34)	5.75%	105	(98)		9.25%	19	50	3	100
15								0	1,819	0	5.75%	0	(105)		9.25%	10	50	(40)	64

Cash Flow IRR = 12.22%

Profitability Comparison
(IRR @ Issue to Insurance Company)

- ■ - Traditional Product Design with only Cash Values Elected
- ♦ - Two–Tier with 20% bonus and Current Annuity Pay Outs Rates

Yield Curves

- ■ - Retail Yield Curve   - ♦ - Yield Curve of Assets Backing Annuitization Policy
- ▶ - Yield Curve of Assets Backing Cash Value Policy

Pay Out Interest Rates

- ■ - Equitable Current Pay Out Interest Rates
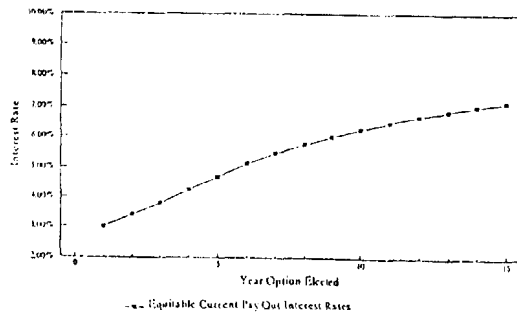
Design Assumptions:		
	Traditional Product Design	Two–Tier Product Design
Initial Expense Factor	10.00%	10.00%
Deferral Surplus Requirement	7.25%	7.25%
Pay Out Surplus Requirement	NA	5.75%
Policy Maintenance Expenses	50	50
Pay Out Form	Cash Value Only	10 Year Certain Annuity Due
Annuitization Bonus	NA	20.00%

Yield Curve Definition of Equity
R.K. Wiard-Bauer
Product Actuary
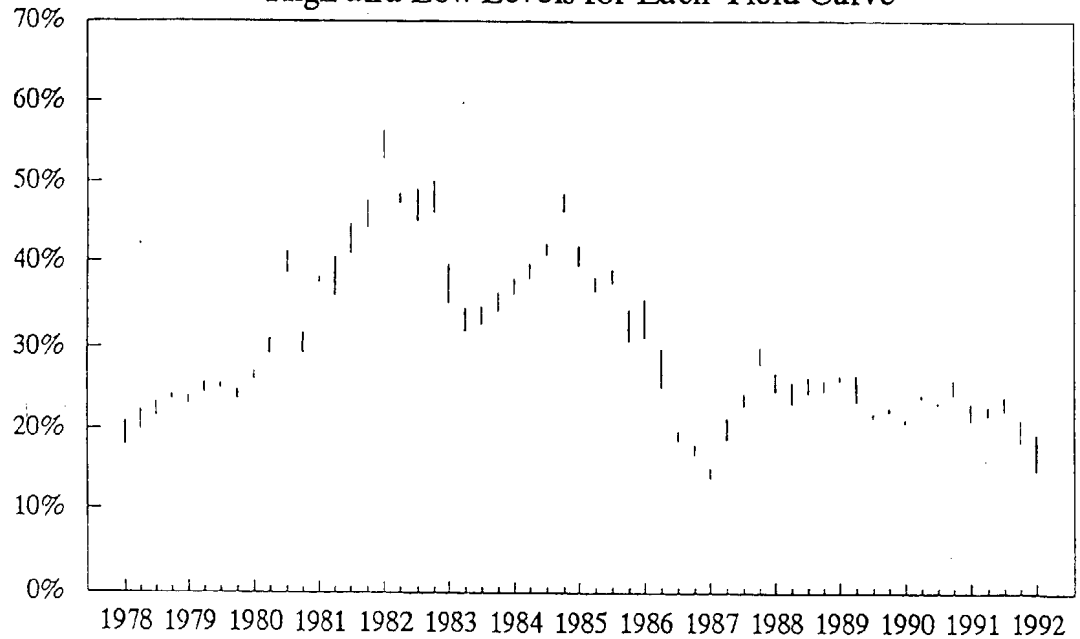LifeUSA
June 22, 1993

The attached graph and supporting data were passed out at the June 17, 1993 Life/Health Actuarial Task Force meeting in Chicago, IL. This write-up was added on June 22, 1993.

Using the methods outlined in my April 1, 1993 research report (part of the March, 1993 NAIC LHATF mailing), historic yield curves were used to determine the equitable differential between the annuitization account and the cash value amount. Values ranged from a low of 13.76% to a high of 56.47%, with the average between 28% and 31%. (In the worksheets, the phrase "bonus" is used. It was suggested by a member of the LHATF that "bonus" was not the best description of the differential).

Conclusions:

1. A 20% or greater differential is achieved under a wide variety of historic yield curves.

2. Thus, a 20% or greater differential is acceptable - with respect to the 20% level, there is no inequity created due to reinvestment risk or multiple premiums under a deferred annuity.

3. The proposed 10% maximum differential is below the level required to preserve equity between policyholders.

4. If the objective of the new annuity standard nonforfeiture law is to preserve equity, it would seem logical to require all annuities to have at least a 14% differential to provide annuitizing policyholders with the same strength of guarantees as terminating (cash value) policyholders.

Annuitization Bonus Required for Equity
High and Low Levels for Each Yield Curve

Based on Treasury Yield Curve for Last Day of Each Quarter

Roger K. Wiard–Bauer, LifeUSA
June 17, 1993

Annuitization Bonus Requirements for Yield Curve Definition of Equity
Last Day of Each Quarter Yield Curves for Treasury Bills, Notes and Bonds
Roger K. Ward--Bauer
Product Actuary
LifeUSA
June 17, 1993

Year	Quarter	Day Ninety	Year One	Year Three	Year Five	Year Ten	Year Twenty	Year Thirty	Bonus Required Min	Max
1978	1	6.05%	6.62%	6.83%	7.05%	7.37%	7.61%	7.67%	18.02%	20.87%
1978	2	6.28%	6.93%	7.30%	7.48%	7.73%	7.95%	7.97%	19.85%	22.16%
1978	3	6.65%	7.46%	7.78%	7.91%	8.12%	8.28%	8.30%	21.58%	23.30%
1978	4	7.21%	8.37%	8.51%	8.49%	8.59%	8.63%	8.61%	23.71%	24.25%
1979	1	8.07%	8.76%	8.43%	8.47%	8.50%	8.57%	8.57%	23.08%	24.07%
1979	2	9.60%	10.55%	9.64%	9.28%	9.12%	8.96%	8.93%	24.56%	25.72%
1979	3	9.77%	10.14%	9.31%	9.18%	9.08%	9.01%	8.98%	25.08%	25.56%
1979	4	9.25%	9.34%	8.56%	8.67%	8.76%	8.78%	8.81%	23.71%	24.91%
1980	1	10.44%	10.78%	9.77%	9.46%	9.42%	9.29%	9.23%	26.06%	27.18%
1980	2	12.53%	11.89%	10.50%	10.35%	10.31%	10.10%	10.08%	29.33%	31.01%
1980	3	14.96%	15.68%	13.45%	13.25%	12.60%	12.40%	12.27%	38.70%	41.13%
1980	4	8.18%	8.42%	9.17%	9.46%	9.98%	10.01%	9.94%	29.38%	31.79%
1981	1	11.89%	12.24%	11.87%	11.81%	11.83%	11.83%	11.70%	37.60%	38.16%
1981	2	15.02%	13.97%	12.65%	12.57%	12.43%	11.96%	11.94%	36.21%	40.42%
1981	3	13.00%	13.01%	13.31%	13.33%	13.10%	12.89%	12.61%	40.94%	44.55%
1981	4	15.08%	14.96%	14.52%	14.25%	13.84%	13.64%	13.30%	44.17%	47.67%
1982	1	15.15%	16.64%	16.37%	16.18%	15.76%	15.58%	15.20%	52.85%	56.47%
1982	2	11.54%	13.31%	13.89%	13.89%	13.93%	14.05%	13.61%	47.32%	48.42%
1982	3	13.90%	14.29%	14.45%	14.30%	14.17%	13.86%	13.66%	45.00%	48.99%
1982	4	13.32%	14.32%	14.63%	14.51%	14.32%	14.06%	13.84%	46.09%	49.94%
1983	1	7.79%	10.24%	11.48%	11.68%	11.93%	11.58%	11.74%	35.37%	39.73%
1983	2	8.13%	8.66%	9.91%	10.21%	10.31%	10.65%	10.64%	32.02%	34.59%
1983	3	8.95%	9.31%	10.07%	10.42%	10.59%	10.82%	10.85%	32.85%	34.85%
1983	4	9.04%	9.60%	10.43%	10.80%	10.89%	11.15%	11.13%	34.42%	36.37%
1984	1	9.00%	9.77%	10.71%	11.15%	11.39%	11.60%	11.46%	36.38%	37.99%
1984	2	9.26%	10.04%	11.07%	11.52%	11.76%	11.98%	11.84%	38.10%	39.73%
1984	3	9.98%	10.73%	11.73%	12.15%	12.43%	12.45%	12.47%	40.89%	42.08%
1984	4	10.26%	12.24%	13.38%	13.71%	13.83%	13.77%	13.68%	46.17%	48.48%
1985	1	10.58%	11.39%	12.22%	12.44%	12.40%	12.31%	12.27%	39.65%	41.82%
1985	2	8.08%	9.19%	10.49%	11.09%	11.45%	11.63%	11.58%	36.68%	38.25%
1985	3	8.44%	9.48%	10.81%	11.32%	11.63%	11.85%	11.71%	37.62%	39.15%
1985	4	7.01%	7.65%	9.09%	9.66%	10.15%	10.55%	10.59%	30.78%	34.55%
1986	1	7.27%	7.93%	9.27%	9.78%	10.33%	10.78%	10.66%	31.35%	35.59%
1986	2	7.24%	7.57%	8.21%	8.58%	8.98%	9.45%	9.34%	25.18%	29.83%
1986	3	6.51%	6.68%	7.07%	7.22%	7.38%	7.51%	7.50%	18.54%	19.75%
1986	4	6.13%	6.39%	6.69%	6.84%	7.00%	7.13%	7.12%	16.83%	18.10%
1987	1	5.31%	5.78%	6.00%	6.14%	6.30%	6.43%	6.42%	13.76%	15.09%
1987	2	5.92%	6.23%	6.81%	7.08%	7.54%	7.69%	7.91%	18.75%	21.28%
1987	3	5.87%	6.65%	7.71%	8.00%	8.37%	8.49%	8.49%	22.95%	24.39%
1987	4	6.77%	7.83%	8.84%	9.18%	9.59%	9.73%	9.74%	28.08%	30.00%
1988	1	5.83%	7.07%	8.01%	8.40%	8.86%	9.01%	8.98%	24.77%	26.97%
1988	2	5.85%	6.74%	7.60%	8.00%	8.54%	8.71%	8.75%	23.22%	25.79%
1988	3	6.74%	7.42%	8.14%	8.40%	8.60%	8.93%	8.85%	24.47%	26.45%
1988	4	7.48%	8.12%	8.49%	8.60%	8.86%	8.95%	8.98%	24.74%	26.12%
1989	1	8.36%	9.01%	9.15%	9.13%	9.14%	9.14%	9.27%	26.14%	26.62%
1989	2	9.19%	9.60%	9.59%	9.47%	8.99%	8.83%	9.09%	23.48%	26.60%
1989	3	8.26%	8.09%	8.03%	8.01%	8.08%	8.10%	8.03%	21.37%	21.86%
1989	4	8.15%	8.46%	8.44%	8.34%	8.29%	8.27%	8.24%	22.22%	22.59%
1990	1	7.78%	7.77%	7.87%	7.86%	7.93%	7.95%	7.98%	20.87%	21.23%
1990	2	8.05%	8.34%	8.67%	8.64%	8.63%	8.63%	8.63%	23.90%	24.28%
1990	3	7.99%	8.03%	8.29%	8.34%	8.41%	8.43%	8.40%	23.09%	23.32%
1990	4	7.36%	7.66%	8.15%	8.45%	8.79%	8.90%	8.94%	24.36%	26.14%
1991	1	6.63%	6.81%	7.36%	7.69%	8.07%	8.20%	8.25%	21.20%	23.17%
1991	2	5.94%	6.26%	7.29%	7.76%	8.04%	8.13%	8.23%	21.69%	22.79%
1991	3	5.68%	6.29%	7.26%	7.83%	8.23%	8.34%	8.40%	22.31%	24.01%
1991	4	5.24%	5.39%	6.21%	6.90%	7.45%	7.63%	7.81%	18.41%	21.16%
1992	1	3.94%	4.07%	5.05%	5.93%	6.70%	6.95%	7.40%	14.87%	19.28%

High	52.85%	56.47%
Low	13.76%	15.09%
Avg	28.96%	30.99%

Average Maximun Tier Differential

For Various Pay Out Interest Rates
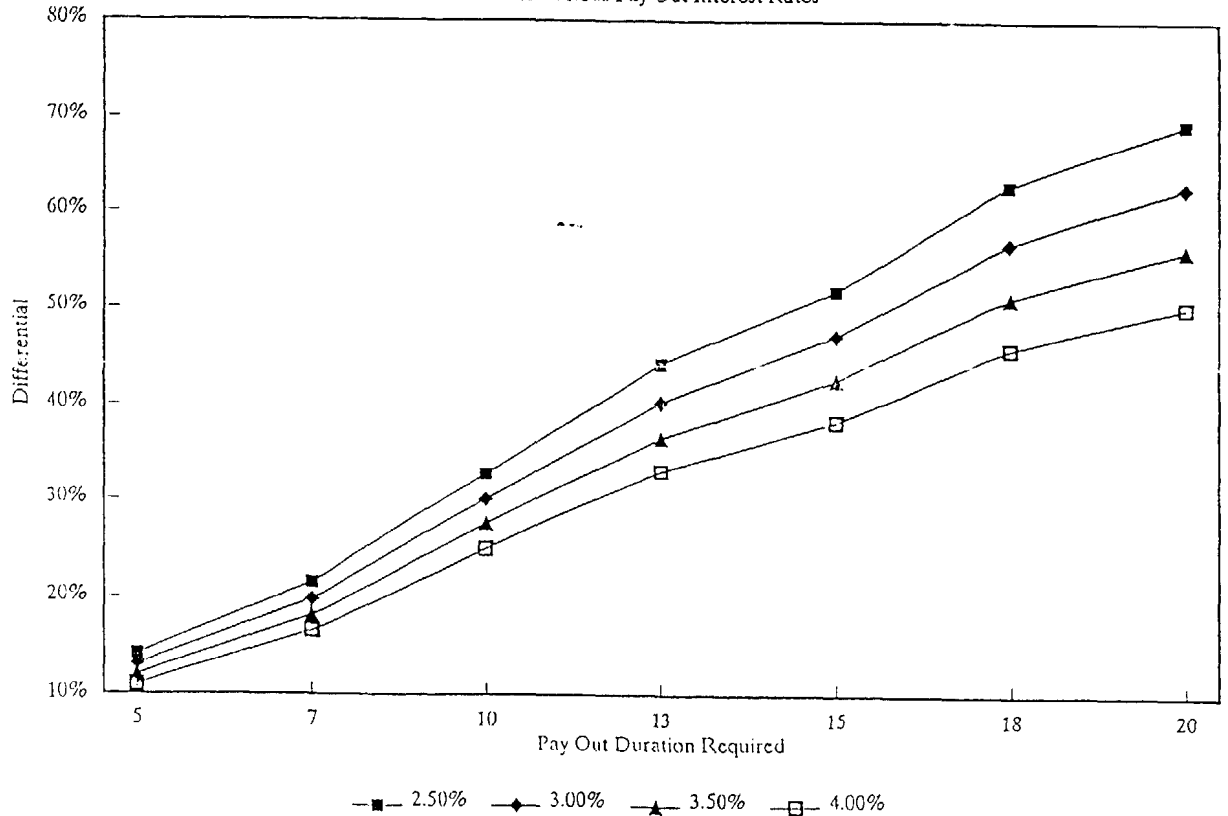
Values shown are calculated using the Treasury Yield Curves for the last day of each quarter for the period 1978 (1st quarter) to 1992 (1st quarter). Prepared by Roger K. Wiard-Bauer, LifeUSA Insurance Company, September 10, 1993

reviewed by the Advisory Committee and the LHATF. The numbers are correct. They also make sense if one considers the impact of all the compound interest between the guaranteed pay out rate and the high interest rates during the 1980's.
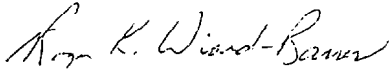
For the shortest pay out periods and highest interest rates, the graph shows that the average maximum pay out differential must be at least 10% to preserve equity.

The graph re-affirms that to preserve equity, a tier differential larger than 10% must be permitted under the new Annuity Non-Forfeiture Law.

Although I am still working on your original challenge to show values for lifetime pay outs, I am hopeful this latest research will encourage, or even convince, you to challenge the LHATF to do more testing. At a minimum, the Industry Advisory Committee should justify the proposed 10% cap. It is premature to release the current draft, even for exposure, before this testing is done.

Thank you for your time and please contact me if you have any questions.

Sincerely,

Roger K. Wiard-Bauer, FSA, MAAA
Product Actuary
(800) 950-5872

cc: Mr. John Montgomery
        Ms. Jean Olson
        Mr. Howard Kayton

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September 15, 1993

Mr. Allan Roby, FSA, MAAA   Send via fax and US Mail
Director, Life & Health Division   Fax #: (203) 566-7410
Connecticut Insurance Department
153 Market Street
PO Box 816
Hartford, CT 06142-0816

Re: Further Research On the Proposed 10% Cap for the Annuity Non-Forfeiture Law

Dear Allan,

At the last Life/Health Actuarial Task Force meeting in Chicago, you challenged me to extend my research by considering lifetime annuities, not just period certain annuities. I was very appreciative of the suggestion and have spent time trying to figure out how to expand the approach used in my research. Unfortunately, my approach doesn't lend itself to life contingent payments. However, I haven't given up yet.

In the meantime, I decided to look at longer pay out durations for annuities certain as a surrogate. A long duration, such as 20 years, should be a reasonable representation of the lifetime pay out. (For an age 65 year old, the life expectancy is about 22 years). To be complete, I decided to test a number of durations and to use a variety of pay out interest rates.

A graph summarizing my results is attached. I used the same treasury yield curves identified in my June 17, 1993 handout to the LHATF.

For the longest duration pay out tested, 20 years, the graph clearly shows that the annuitization value must be 50% to 70% higher on average than the cash value. I say on average, because the graph shows the average maximum tier differential over all yield curves tested. If I had not used the average and had used the highest of all possible values, the largest 20 year value for all yield curves was an amazing 130%. (This means the annuitization value is 2.3 times the cash value). I'm using the same methods that have been