NON-TRADITIONAL GUARANTEES ON LIFE AND ANNUITY PRODUCTS

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Introduction

"Non-traditional" guarantees refer to guarantees that are in addition to traditional mortality, expense, and interest guarantees. Examples of such types of guarantees are death and living benefits on variable annuity contracts and no-lapse guarantees on universal life or variable universal life products.

Many companies have greatly expanded their offerings of non-traditional guarantees over the past few years. While the resulting blocks of business are very large, most of these guarantees have not been inforce for long enough periods to produce a solid basis for assumptions or projections of long-term results.

An insurance company offering such non-traditional guarantees faces a complex situation to analyze and manage, both when deciding to issue the guarantee and later in the management of the inforce block. Many decisions must be analyzed both at the product level and in a larger corporate, competitive and regulatory context. Third-party individuals or organizations dealing with insurers who offer non-traditional guarantees must often do similar analyses.

The purpose of this paper is to offer practitioners an overview of the various issues concerning the pricing of these guarantees, the many other issues which need to be analyzed and addressed in the determination of risks and the management of the block of business, and the results of a company survey of practices. This paper is based on the working knowledge of the authors, a broad compilation of literature and the company survey results. At the end of most sections of the paper, we have provided a list of resources which we have selected as some of the best sources available for those practitioners interested in researching the subject matter further.

As part of the research for this paper, we conducted a survey of company practices for issues related to non-traditional guarantees. Participation in the survey was voluntary. The survey was distributed to the major companies selling individual life and annuity products with non-traditional guarantees and to the members of the Society of Actuaries' Product Development Section for distribution at their companies.

The survey was divided into three parts: Annuities, Variable and Universal Life Insurance, and Term Life Insurance. Most companies submitted responses to all three parts. However, some companies did not sell all product lines and responded only to the applicable sections of the survey. In addition, there were a few companies that marketed all three product lines but chose to respond to only one or two parts of the survey.

33 companies sent responses to all or part of the survey. 29 of these companies responded to the annuity section. These respondents represented approximately 64 percent of industry sales of variable annuities during the 2003-2004 period (based on VARDS data as reported in The National Underwriter, 2003-2004). For the variable and universal life insurance section of the survey, there were 31 respondents representing approximately 73 percent of industry sales of variable universal life during the 2003-2004

period (based on VARDS data as reported in The National Underwriter, 2003-2004). Similarly to the variable and universal life section of the survey, 31 companies completed the term life insurance section of the survey.

In reviewing the responses for each part of the survey, some participants omitted answers to a few questions. In addition, there were questions designed to permit multiple responses from participants. Therefore, the number of responses to each question varies.

Companies with dominance in the marketplace often face a different situation than smaller competitors, whether through greater economies of scale, more diversification, more or less control over the actions of distribution organizations, or other factors which make the risks of issuing such guarantees different for companies with larger market shares. This is especially true in the variable product market, where the business is concentrated in companies with extremely large blocks of business. Because of this market concentration, we thought there might be differences in survey results for companies with different levels of market dominance. As a proxy for market dominance for annuities, we divided the respondents into two groups: "top 25" companies if they were in the top 25 sellers of variable annuities during the 2003-2004 period, and "non-top 25" for all other annuity companies. Based on this criterion, 15 of the 29 annuity companies responding to the survey are classified as "top 25" and the remaining 14 companies are in the "non-top 25" category. Similarly, for universal life respondents we divided the respondents into two groups: "top 25" if they were in the top 25 sellers of variable universal life insurance during the 2003-2004 period, and "non-top 25" for those companies not meeting the "top 25" criterion. In examining the 31 universal life respondents, 16 companies are classified as "top 25" and 15 companies are "non-top 25" (all sales data is based on VARDS data as reported in The National Underwriter, 2003-2004).

In presenting the survey results for annuity and universal life companies, results are separated into the "top 25" and "non-top 25" categories where the responses are significantly different for the two groups. Term responses were not divided since there did not appear to be as sharp of a division in market dominance for the participating term companies.

This paper is organized into three sections. Section 1 describes many types of non-traditional guarantees, and briefly lists some of the associated risks. Section 2 discusses the risks and risk control strategies. Practitioners familiar with product designs may want to jump directly to Section 2. Section 3 reviews the limited information on company experience to date.

Appendices are also included in the paper. Appendix 1 is an overview of the regulations relevant to products with non-traditional guarantees. Appendix 2 contains the company survey results and Appendix 3 is a copy of the survey.

While included in Appendix 2, for convenience in using this paper, survey results are also shown under each relevant section of the paper.

Section 1: Non-Traditional Guaranteed Benefits And Associated Risks

"Non-traditional" guaranteed benefits is not a defined industry term; however, in this paper, it means benefits which have evolved recently in the individual life insurance and annuity marketplaces and make guarantees beyond the traditional mortality, interest and expense guarantees. This section lists many of these types of guarantees currently available or under consideration by life insurance and annuity companies, but is not an exhaustive list of all of the possibilities. Non-traditional guarantees have been developed to enhance many benefits, including:

- Guarantees on cash values
- Guarantees on death benefits
- Guarantees on supplemental benefits
- Guarantees or conditional guarantees on charges
- Guaranteed or conditional waivers of charges
- Supplemental guarantees, bonuses, or extra credits
- Guarantees on payouts or income benefits
- No-lapse guarantees
- Extensions of benefits
- Exchange or conversion benefits or policy split options
- Accelerated benefits

A. Annuities

There are a wide variety of types of non-traditional guarantees on annuities. The most prominent guarantee in the market has been the guaranteed minimum death benefit on variable annuities. More recently, the guaranteed minimum withdrawal benefit on variable annuities has been a major determinant of sales in some markets.

The guaranteed benefits have a wide variety of features and design details. General features and restrictions that must be determined on most types of benefits include:

1. Caps or restrictions on benefits based on issue ages, attained ages, or premium amounts.
2. How taking partial withdrawals affects the benefit.
3. How the charge for the benefit is assessed and deducted.
4. Whether the benefit requires any constraints on allocation of assets.
5. Whether the benefit can be added, changed, or dropped after issue.
6. Whether the benefit is part of the contract, or an optional rider.
7. Whether the benefit is offered in multiple variations, offering a menu of choices.
8. Whether the benefit terms and charges are fully guaranteed or the company reserves some rights to make changes.

9. Whether paying benefit amounts only if over a certain threshold or deductible amount, as thresholds and deductibles are potential ways to lower the cost.

I. Variable Annuities

Benefit types available or under consideration on variable annuities include the following:

a) *Guaranteed Minimum Death Benefit (GMDB)*. This benefit guarantees a payment on death that may exceed the account value. The guarantee can be based on either the premium or the account value. Premium-based guarantees pay either the premium or the premium accumulated with interest. The interest rate is either a stated flat rate or a rate tied to an external index. Account-based guarantees may pay a benefit based on the highest account value achieved, periodically resetting the benefit to the account value, various types of ratchets which increase the value at set times, or averaging. Some benefits offer the greater of a premium-based guarantee or an account-based guarantee. Contracts designed to attract 1035 business may have an initially higher death benefit or bonus to be comparable to the death benefit of the exchanged contract.

   Age cutoffs are common, both the maximum age for purchase of the benefit and the attained age at which the benefit freezes. The initial product designs did not reduce the benefit proportionately on partial withdrawals (a "dollar for dollar" reduction only), and potentially could lead to a high risk situation where the bulk of the funds could be withdrawn from the annuity but the death benefit would remain high. At least one secondary market company is offering to buy contracts from older policyowners with this type of benefit, locking in the risk to the insurance company. Many more recent contracts have shifted to a provision where partial withdrawals reduce the death benefit guarantee proportionately.

b) *Guaranteed Minimum Withdrawal Benefit (GMWB)*. This benefit guarantees a minimum amount available for partial withdrawals. It is typically an elective benefit, with a separate charge. The withdrawals are made at the contractowner's option. A typical guarantee is to guarantee that withdrawals may be taken as a percentage of premium, such as 7 percent per year, until the premium is exhausted. Design decisions include:

   1. Is it based on premiums received initially, during the first couple of years only, or on later premiums as well? Are there maximum premium limits?
   2. Can it be cancelled after a certain period?
   3. Can it step up to the current contract value at some date? How does this change the charge?
   4. Is there a waiting period before withdrawals can start? This is not a common feature, but some designs offer a higher withdrawal amount with a waiting period

5. What happens if withdrawals are in excess of the GMWB amount? Typically, the excess amounts can be withdrawn but future guaranteed withdrawals are reduced, for example, to the lesser of the contract value or the GMWB less withdrawals.
6. What happens if withdrawals are less than the GMWB amount? Can unused amounts carry over year to year, or is the recovery period stretched out? Is there any reduction in the charge?
7. If the benefit is not used, is the charge waived or reduced after a certain period?
8. Can it be elected after issue?

c) *Guaranteed Minimum Income Benefit (GMIB).* This benefit is sold on a deferred annuity, guaranteeing a certain minimum value on annuitization. The benefit is usually elective, with a charge assessed against either the account value or the GMIB. The contractowner may decide when to annuitize the contract, but there is usually a 7-to-10 year waiting period after purchase before the GMIB is effective. Sales of this benefit are usually restricted to a minimum and maximum issue age.

At annuitization, the typical benefit is to get the higher of the GMIB based on the guaranteed purchase rates, or the current account value applied to the current purchase rates, so the worth of the GMIB may depend on the size of the guaranteed purchase rates. There are a number of different ways of determining the GMIB, such as a rollup of premium with or without a cap, the highest account value achieved, or a ratchet up with account value. Other design issues include whether the benefit stops increasing at a certain age, and the effect of partial withdrawals. There may be restrictions on the investment allocations during the deferral period.

A product might bundle the GMIB together with a GMDB as a hedge in the sense that one is collected by living and the other by dying.

d) *Guaranteed Minimum Accumulation Benefit (GMAB).* This is typically an elective benefit, with a separate charge. Specific asset allocation is usually required; the charge may depend on the investment restrictions. The guarantee is a guarantee of a minimum account value that is typically a multiple of premium after a fairly long waiting period, such as the return of premium after 10 years.

e) *Enhanced Earning Benefit (EEB).* This benefit is an enhanced amount paid on death, designed to cover tax liability. The benefit is typically somewhere between 15 percent and 70 percent of the account value. The percentage may vary by issue age, or be capped at a maximum percentage of premium. The benefit is usually elective, with a charge as a percentage of assets. There are typically restrictions on fund allocations or the percentage of equity exposure.

The risk profile of the above benefits (GMDB, GMWB, GMIB, GMAB, and EEB) follows:

These benefits generally have wide downside potential and limited upside profit potential for insurance companies for each contract sold, but may make a major difference in the total amount of business sold or in access to distribution outlets.

These benefits incur almost all the types of risks described in this paper. The major risk is the combination of capital market risk with policyowner control of the liabilities. Sales of these policies tend to be concentrated through limited distribution firms, thus increasing the risk of mass 1035 exchanges or other policyowner actions influenced by distributors. The rate of utilization of the GMIB is especially difficult to predict. Deferred annuities generally have very low annuitization rates, but there is no experience on annuitization rates with this benefit attached.

Market conduct issues are emerging risks for these products, through regulatory examination of the suitability of sales, especially to older purchasers or qualified plans, and the late trading and market timing and related issues facing some of the underlying fund groups. Regulatory scrutiny or market conduct investigations may result in curtailment of certain types of sales, negative effects on distributor relationships, financial penalties or harmful publicity.

Sales in this market are extremely competitive and there are significant expense risks at not meeting competitive levels of critical mass. Risks of higher reserve and capital costs, especially under RBC C-3 Phase II, are ongoing and will affect both inforce and new business. While secondary market activity is minor at this point, it could develop into a major new risk causing increased persistency for policies that are in the money.

Risk control strategies for these benefits involve efforts in many areas. Careful stochastic analysis and evaluating hedging strategies are important. Reinsurance at this point is generally not available. The details of product design, especially restrictions that lower the tail exposure, are critical. Maintaining strong distributor relationships may help protect the business against high levels of 1035 exchanges. Clear and careful disclosure of these benefits in all sources for customers and distributors is mandatory. Disclosure of the GMIB benefit may be especially difficult, since the customer may have difficulty understanding that the purchase rates applied to the guaranteed amount may be different than the current purchase rates, and there are associated risks of customer dissatisfaction or litigation.

f) *Enhanced Dollar Cost Averaging Rates (DCA).* Enhanced DCA rates are interest crediting rates often well in excess of market rates. These rates are guaranteed on premiums paid into a fixed account for a limited period with periodic transfers into investment accounts, allowing the contractowner both interest gains along with the ability to do dollar cost averaging into equity accounts.

   This risk of this guarantee can be estimated, since the cost is the differential between earned and credited rates during a short period of time.

g) *Payout Floor (GPAF)*. This benefit applies during the annuity period, offering a guarantee on annuity payouts from variable accounts. The guarantee is usually that future payments will not be below some percentage of the first annuity payment, with no restriction on upside growth. The benefit may require investment in certain funds, such as an S&P 500 fund. The charge may be assessed at annuitization or may be an annual charge on the reserve amount.

   The major risk here is capital market risk, mitigated by any hedging strategy used.

h) *Spousal Step-up Benefit*. This benefit allows the spouse to take over and continue the contract after the contractowner's death, with the account value immediately after death increased by any amount that the death benefit exceeds the account value at the moment of death.

   This is an additional factor for products with GMDBs.

i) *Fixed Accounts Under Variable Annuities*. Most variable annuities have a basic fixed account option. Sometimes purchasers buy a variable annuity for just the fixed account if it has more favorable terms than a stand-alone fixed product. For products with C or L shares, it is often unprofitable to offer a fixed account with no associated surrender charge.

   Some fixed account options can be for longer durations or have other enhanced guarantees. Equity-indexed accounts may be offered under a variable annuity.

   The risks of fixed accounts under variable annuities are usually similar to the well-known asset/liability risks of fixed annuities, combined with the uncertain rates of allocation to and transfers out of the fixed account.

j) *Principal Protection Plans*. Principal may be guaranteed through contractual terms, or from a separate account guarantee, or from investment in a principal protection fund.

   Principal protection plans usually have risk coverage from the terms of the fund or associated hedging or third-party resources.

The availability of nontraditional guarantees on variable annuities has been prevalent. According to the National Association for Variable Annuities (NAVA), as of the end of 2003, for contracts available for sale:

58% have GMDBs greater than return of premium.
15% have GMWBs
27% have GMIBs
12% have GMABs

(Source: NAVA. 2004 Annuity Fact Book. 2004, 3rd edition, pp. 29-31)

II. Fixed Annuities

Enhanced fixed annuity interest guarantees may include multi-year interest guarantees, stair-step current interest rate guarantees, higher tiered interest rates on contingent events, CD-type annuities, bailout provisions, market-value adjustments or index-based guarantees.

The risks with enhanced fixed annuity interest guarantees are the familiar asset-liability risks.

III. Equity Index Annuities (EIAs)

There are a wide variety of equity-indexed designs. The most common designs are annual ratchets, where the credited rate is based on an index each year, with a minimum floor of zero. With this design the value may ratchet up each year but not down. Other designs are based on two-year ratchets, multi-year point-to-point with a floor of some small gain, or designs based on high water marks (highest value achieved). Other variations include all or nothing designs where there is one rate if the market is up and zero credit if it is down, such as a one-year point-to-point based on the S&P rate.

EIAs are designed with hedging in mind and the primary risk is whether the cost of the hedge is covered in the pricing and design, i.e., the flexibility exists to adjust the participation percentage. Some of the more unusual designs may be difficult to hedge in the open market, leading to residual risk and cost. EIA pricing may be deterministic if the company is confident that the risk is fully hedged/hedgeable, and the cost is covered in the participation rate. Evaluating the hedge program itself or analyzing the cost of hedging would require stochastic options analysis. Customized hedges or other co-party risk transfers have proven quite expensive when the market is volatile.

IV. Other Annuity Guarantees - Variable or Fixed

a) *Bonuses.* Some bonuses are designed as incentives to purchase. Bonuses can be based on the premium or the account value. Premium bonuses often are compensated for by higher annual asset charges or interest spreads, and longer surrender charges. Some bonus amounts cannot be withdrawn or are conditional on death or annuitization. Some bonuses have been specifically designed to attract 1035 business, for example amounts designed to compensate for the surrender charge on the exchanged annuity.

Bonuses may be designed to reward persistency or annuitization, and may vary by duration or age.

Based on the authors' experiences it is fairly easy to estimate the outlay of a bonus program, but more difficult to estimate the potential revenue enhancement from increased sales due to the bonus program. Bonuses are the subject of regulatory attention and face corresponding risks.

b) *Free Partial Withdrawals.* Withdrawal charges commonly allow some percentage of funds to be taken without charge. More expanded provisions allow the entire amount to be taken free on certain contingencies, such as death, disability, nursing home confinement, or unemployment.

A new design is including a longevity guarantee up to a certain level of systematic withdrawals, which guarantees a minimum payout for life.

c) *Immediate Annuities.* Immediate annuities may be standalone products, or options under deferred annuities. Variable annuity guaranteed payout options are described above. Fixed payouts may have inflation-protection options, or benefits that increase on contingent events. Other possible variations include equity-indexed immediate annuities. Many immediate annuities now offer some access to funds, either as a commutation of some or all of the remaining payments or as a withdrawal. These benefits are generally on payouts with a certain period, rather than a pure life contingent payout. There is usually a defined period during which withdrawals can be made, and if the period is shorter, the payments may be higher. There are also options for guaranteed death benefits or death benefits in the early years. There may be the right to change payout options after issue. Payments at contract issue of a deferred annuity may be applied to annuitization benefits at favorable terms.

These products are subject to interest rate risks, combined with asset-liability risks where payouts may be changed or amounts withdrawn. Since offering access to funds is a new product design, there is not enough industry experience to anticipate rates of commutations or withdrawals.

d) *Underwritten Annuities.* Underwritten immediate annuities are not common but there are some available and it is anticipated to be a growing trend. There is not much certainty about classifying annuitants into risk classes or assessing the risks of anti-selection. The period certain feature of most payout options lessens the effect of underwriting.

e) *Annuities with Long-term Care Features.* Adding long-term care features to annuities is becoming a focus of development, given the needs of the aging baby boom population. There can be enhanced streams of payments from a deferred annuity or an annuity in payout status contingent on entrance into a long-term care facility or on chronic permanent illness. Amounts may be flat or with

inflation protection, or structured to meet per diem needs. Benefits may be underwritten but are more likely to be guaranteed issue with a long period of no coverage. Another variation is to use payments from an annuity to fund a long-term care policy, with free withdrawals to pay the premium, or higher cash values available on long-term care.

Survey Results for Annuity Benefits

Benefits Offered:

I. Variable Annuities

The number of survey companies (out of 29 respondents) offering these benefits, from most to least common benefits, are:

Total	"Top 25"	Non-Traditional Guarantee
26	15	GMDB
18	12	EEB
14	10	DCA
14	10	GMAB
14	10	spousal step-up benefits on death
11	10	GMWB
9	6	GMIB
5	4	Principal Protection Plans (guarantees that the values of the contract, under certain conditions of investment, is not less than the invested amount)
4	3	GPAF (guaranteed payout annuity floor, guaranteeing a floor on subsequent annuity payments in relation to the first payment)

II. Equity-indexed Annuities

4 companies offer EIAs with annual ratchet
2 companies offer EIAs with multi-year point-to-point

III. Other Annuity Benefits

17 companies offer commutation payouts or withdrawals on income annuities
4 companies offer long-term care benefits on annuities
3 companies offer underwritten income annuities
3 companies offer payout guarantees on deferred annuities (other than nominal guarantees)

Competitive Importance of Offering the Guarantees:
Companies were asked to indicate how important the non-traditional guarantees on annuities have been to achieving their marketing goals, based on the following 1-5 scale:

1: Mandatory to sell in our market
2: Increases sales significantly
3: Increases sales somewhat
4: Not as important as other product or compensation factors
5: Unimportant

For the "top 25" companies, benefits in approximate order from most to least important are:

Non-Traditional Guarantee	Response
GMDB	Mainly "1's"
GMWB	"1's" and "2's"
GMIB	Mainly "2's" and "3's"
GMAB	Mainly "3's"
GPAF, EEB, Principal Protection Plans, DCA, Spousal step-up on death, Commutation payments or withdrawals on income annuities	Mainly "3's" and "5's". However, one company rated EEB as a "1", one company rated spousal step-up as a "1" and three companies rated DCA as a "1"
EIAs, Underwritten annuities and Payout guarantees on annuities (other than nominal guarantees)	Mainly "5's"; however, two companies in this group offered EIAs and rated this product much higher.

For the companies not in the "top 25", benefits in approximate order from most to least important are:

Non-Traditional Guarantee	Response
GMDB	Mainly "1's"
GMWB, GMIB, GMAB, GPAF, DCA, Spousal step-up on death, Commutation payouts or withdrawals on income annuities, Underwritten annuities	Mainly "3's" through "5's"
EEB	Mainly "1's" and "4's". Only 2 companies in this group offered an EIA and rated it as a "1" or "2".
Principal Protection Plans, Payout guarantees on annuities (other than nominal guarantees)	Mainly "5's".

B. Universal Life Insurance

I. UL With Secondary Guarantees

The major new life insurance non-traditional benefit is a secondary guarantee on universal life (UL). This guarantee has been a driver of recent sales of UL policies. The guarantee is that a certain level of premium will guarantee that the policy stays inforce for a certain duration. For example, payment of the minimum premium may guarantee 10 or 15 years inforce, payment of the commissionable target premium may guarantee 20 years inforce, and payment of a higher premium may guarantee lifetime inforce. There may be a fairly small difference between these premium amounts. Some premium requirements are based on the accumulation of the premium at interest, since this may help contracts stay under the 7702 limits. Guarantees may be automatic based on the premium selected, or may be optional benefits issued by riders.

Contracts may have a catch-up feature, which allows premiums to be below the required amount for the guarantee for a period of time, with the amount caught up by a deposit at a later date. On loans and withdrawals, there may be a revised premium amount for the guarantee, or there may be a provision to pay back the loan or withdrawal in order to keep the guarantee. Some contracts allow the extension or reduction of the guarantee after issue. Some new contracts are putting guarantees on increasing death benefit policies as well as level death benefit policies.

There are two common designs. One design sets the no-lapse premium at the cumulative premium, sometimes with interest, less withdrawals and debt. If this amount is at least equal to the required premium, the contract stays inforce. The other design is based on a "shadow fund." The shadow fund is a UL-type calculation done using different factors than the policy account value. The policy stays inforce as long as the shadow account is positive. Some newer shadow account designs have different charges and credits based on the premium payment pattern or amount of the shadow account value.

The shadow design can usually handle policy changes more easily than the required premium design. There are two different ways to administer the shadow fund design. One approach is to administer the policy as one plan, with the shadow account tracked separately. The other method is to administer it as two plans, with a trigger if the shadow fund plan becomes negative. Shadow designs had more favorable reserve treatment when they were first introduced, but the situation now is uncertain, pending NAIC action. Design specifics may significantly impact the statutory reserve.

In addition to the required premium and the shadow fund methods, there are other possibilities for UL guarantees, such as a YRT-structured secondary guarantee. It may be difficult to find a single type of guarantee that fits best for all ages, premiums, and guarantee periods.

UL no-lapse guarantees effectively set a minimum interest rate on policy assets. Relatively sophisticated interest rate generators are commonly used in the life insurance industry and are well understood by practitioners. Where a minimum interest guarantee is set either explicitly or, as in UL guarantees, implicitly, it may be worth testing the option price of such a guarantee by a stochastic interest rate projection. A key assumption is the mean interest rate to be earned on assets and how quickly the random rate reverts to that mean. Hedging strategies may help the risk or lower the guaranteed premium. Depending on the design and the catch-up feature, premium payment patterns may produce different levels of profits and risks.

Lapse assumptions for these products are critical variables in pricing. At some point on UL policies with secondary guarantees, the present value of future profits may be negative or the cash values may be zero but the policy stays inforce, so lapses are beneficial. The emergence of secondary market firms looking for profitable business may disrupt the lapse patterns and create unforeseen risks for insurance companies.

Disclosure is also a risk. It is difficult to explain a shadow fund in understandable terms, especially in communicating the non-availability of the shadow fund value, which can create market conduct or litigation risks for a company. Shadow fund products also may be subject to difficult administration and associated risks.

Testing this product under all cells, including premium payment patterns and guarantee durations, is critical. Stochastic testing under a range of interest rate scenarios may be necessary. The assumption of statutory reserves and future requirements is uncertain at this point, and sufficiency tests need to be run in addition to the statutory requirements.

II. Survivorship Life

Survivorship life may offer the right to split the policy on divorce or other contingences, or to change or unwind the policy on estate tax law changes. The uncertainty of the estate tax law in the future creates substantial uncertainty for these products.

III. Other Life Guarantees

There are a wide variety of other types of guarantees on life insurance products, with risks specific to each. A partial list of current and future possibilities includes:

a) Prepayment discounts
b) Automatic systematic withdrawals
c) Premiums which increase only on certain contingent events
d) Lapse-protection rider that allows a policy to become automatically reduced paid-up when loans and withdrawals are exhausted
e) Base policy plus term rider blends allowing a choice of price, coverage, and compensation levels
f) Accounting benefit riders
g) Products with high early cash values

h) Extended issue and maturity ages. Maturity extensions are not needed under 2001 CSO
i) Bonuses
    - On annuitization of cash surrender value
    - On premium
    - On cash accumulation value at age 100
    - Interest bonuses
j) Charitable giving rider which pays an additional percentage of the death benefit, such as 1 percent, to a charity at death
k) Estate Tax Repeal rider which waives the surrender charge if there is no federal estate tax in 2011
l) Disability rider that pays premium or set amount into contract on disability
m) Acceleration of the death benefit on terminal illness
n) Long-term care or chronic illness rider pays a percentage of the death benefit, such as 2 percent or 4 percent, on a monthly basis for a one or two year period, with a possibility of extension, for major but recoverable illnesses. The payment is made as a withdrawal up to the basis, then as a loan. There may be a residual death benefit even after the payments exhaust the original death benefit. Another variant may increase the death benefit on long-term care.
o) New hedging instruments may open up new possibilities, such as benefits that are accelerated or increased when contingent events such as illness, nursing home confinement, unemployment, or college enrollment occur.
p) Premium financing plans: A loan may be taken with the life insurance assigned to secure the loan, and a casualty policy issued to cover any insufficiency in the cash value to cover the loan.

IV. Variable Universal Life (VUL) Guarantees

There are two trends in developing non-traditional benefits for variable UL. One trend is to add variable annuity type living benefits to the VUL policy, such as the GMWB or the GMIB. The risks of these benefits are similar to the risks of the comparable variable annuity benefits.

The second trend is to extend the UL secondary guarantees to VUL. For the guarantee, the required premium must generally be invested in the fixed account, and a limit is placed on policy debt. The required premium depends on the choice of the guaranteed period. The required premium for a lifetime guarantee is typically in the range of 65 percent to 70 percent of the guideline level premium. The goal for a guarantee to retirement age is often the commissionable premium. The risks of this benefit are generally similar to a UL policy with the same guarantees.

Survey Results For UL Benefits

Benefits Offered:

Out of 31 respondents, the number of companies reporting each type of guarantee, from most to least common:

Total	"Top 25"	Non-traditional Guarantee
21	16	VUL with no-lapse guarantee 12 companies have lifetime or to age 100 guarantees (10 of these companies are "top 25") 1 company has 30 year guarantee 3 companies have 20 year guarantees 1 company has guarantee to age 85, 1 to age 75, 1 to age 70 other guarantees are for various shorter periods
20	12	UL with Premium no-lapse guarantee 14 companies have lifetime or to age 100 guarantees (9 of these companies are "top 25") 1 company has 30 year guarantee but other company guarantees for various shorter periods 16 companies have a catch-up feature (10 of these are "top 25" companies)
19	14	Policy split option on survivorship life
19	13	Accelerated benefits on UL or VUL
12	10	UL with shadow fund
9	7	Estate tax unwind on survivorship life
3	3	Long-term care benefits on UL or VUL
1	0	Bonus or refund triggered if current charges are increased

Competitive Importance of Offering the Guarantees:
Companies were asked to indicate how important the non-traditional guarantees have been to achieving their marketing goals, based on the following 1-5 scale:

1: Mandatory to sell in our market
2: Increases sales significantly
3: Increases sales somewhat
4: Not as important as other product or compensation factors
5: Unimportant

For the "top 25" companies, benefits in approximate order from most to least important are:

Non-Traditional Guarantee	Response
UL with no-lapse guarantee based on shadow fund	Mainly "1's"
UL with premium no-lapse guarantee	Mainly "1's", with some "2's" through 4's
VUL with no-lapse guarantee	"1's" through "5's" with an average of "3"
Survivorship life with estate tax unwind or Policy split option	"1's" through "5's" with an average of "4".

Few companies responded to the question for UL or VUL with long-term care benefits or bonuses or refunds if current charges increase.

For the companies not in the "top 25", benefits in approximate order from most to least important are:

Non-Traditional Guarantee	Response
UL with premium no-lapse guarantee	Divided between "1's" and "3's"
UL with no-lapse guarantee based on shadow fund	Only two respondents with a "1" or "2" ranking
VUL with no-lapse guarantee	Mainly "3's"
Accelerated benefits on UL or VUL, Bonuses or refunds triggered if current charges increase, Survivorship life with estate tax unwind or Policy split option	"3's" through "5's"

C. Term Life Insurance

The most popular guarantees for term insurance are long-term premium guarantees and guarantees of return of premium. Many companies also offer favorable conversion terms to other policies. Cash value term is not common.

Long-term Premium Guarantees
These policies guarantee a premium schedule for a period of years. The risks involved in pricing and managing these products are the traditional interest, lapse, and mortality risks. The emergence of secondary market activity may affect the lapse risk. Statutory reserving costs are a significant factor on level premium guarantees.

Return of Premium Guarantees
Return of premium is usually an optional benefit provided by rider. The premium is returned at the end of the term period, such as 15 or 30 years. Some products offer a partial return of premium after a shorter period of years. The price for the return-of-premium benefit is usually small when the return is after a long period. The policy premium may be lower than a universal life policy with a cash value equal to the returned premium at the same duration.

In pricing term life insurance with return of premium benefit, the lapse assumption is difficult to estimate. Lapse rates in the early years may be fairly high because of the high premium. Lapse rates are likely to be lower closer to the return of premium benefit date. If the policy period extends beyond the return of premium date, then lapse rates may be high after that date with increased mortality anti-selection. Secondary market activity may significantly change the anticipated lapse rates. Return of premium benefits are usually not reinsured.

Survey Results for Term Benefits

Benefits Offered:

Out of 31 companies, the number of companies reporting each type of benefit guarantee are:

Number of Companies	Non-Traditional Guarantee
19	Long-term premium guarantee 11 companies - 30 year guarantee 6 companies - 20 year guarantee 1 company - 10 year guarantee 1 company did not specify length
18	Favorable conversion provisions to other life products
2	Cash values
1	Guaranteed full return of premium
1	Guaranteed partial return of premium
1	Guarantees tied to external index or event

Competitive Importance of Offering the Guarantees:
Companies were asked to indicate how important the non-traditional guarantees have been to achieving their marketing goals, based on the following 1-5 scale:

1: Mandatory to sell in our market
2: Increases sales significantly
3: Increases sales somewhat
4: Not as important as other product or compensation factors
5: Unimportant

For the companies responding, benefits in approximate order from most to least important are shown below. In reviewing the results, keep in mind that most companies only offered long-term premium guarantees or favorable conversion provisions to other life products.

Non-Traditional Guarantee	Response
Long-term premium guarantee	Mainly "1's" and a few "2's"
Favorable conversion provisions to other life products	1's through "5's" with an average of "3"
Cash values	One company rated as a "1"
Guaranteed return of full premium	One company rated as a "1"

D. Other Products And Types Of Guarantees

Convergence Products
Convergence products are products that combine insurance, securities, or banking products. Examples are a Treasury-linked annuity or putting a death benefit on a certificate of deposit. Currently, there are not many convergence products found in the marketplace and the risks are specific to each.

Lifetime Products
The goal of a lifetime product is to have a product that converts to the best vehicle at various stages in a customer's life. At this point, these products are more theoretical than real given regulatory and tax issues.

Sale of Two Products
When the 7702 rules for single premium life insurance changed, seven-pay annuities were used to fund life insurance. Sometimes annuities are bought from multiple carriers for various withdrawal programs.

Arbitrage is possible between an annuity and a life product where the underwriting differs, with the life policy in a better underwriting class than the annuity. The scheme is to borrow money from an affiliated or independent financial institution to buy a single premium immediate annuity(SPIA) and then use the SPIA payment to pay loan interest

and the premium of the life policy. If the death benefit of the life policy is greater than the loan, there is a gain on death.

Any sale of two products simultaneously gets into complicated areas with risks of disclosure and suitability.

Funds

Funds under variable annuities or variable life insurance have become more unusual than the basic stock and bond funds. Types of funds may include:

- Hedge funds
- Principal-protected equity funds
- Asset allocation funds
- Dividend yield funds
- Inflation-protection funds
- Exchange-traded funds
- Funds of funds
- Closed funds

For all of these arrangements, risks occur based on difficulties in clear disclosure, market conduct issues, diversification risks, and performance as it affects guaranteed values or policyowner satisfaction, withdrawals or surrenders.

Asset Allocation Programs

Dynamic asset allocation programs are popular but face SEC review for issues such as whether it is the provision of investment advice or whether it is a fund of funds that needs to be registered. Market timing issues and associated risks exist for asset allocation programs.

Section 2: Risks And Control Strategies

A. Risks And Financial Issues

1. Risks of Non-Traditional Guarantees

Products with non-traditional guarantees involve all of the standard risks that are traditionally evaluated in pricing, such as adverse claims, lapse, interest rates, investment returns, or fund accumulation experience. Some risks can be assessed quantitatively, while other risks are not subject to easy quantification.

For many of the non-traditional guarantees, the biggest source of risk is the combination of capital market risk with liabilities under the policyowner's control. The insurer grants options to the policyowner, which may be under-priced due to miscalculation of the basic risk or the level of utilization of the option granted. Most capital market risks (poor performance, illiquidity, credit deterioration, concentration, call anti-selection, etc.) are familiar to life insurers as investors but it is worth noting that, to the degree the management of non-traditional guarantees requires it, the insurer may have to trade in instruments with a different balance of risk. Thus, the public options market may be thin and illiquid, with options not available or sellable as needed. Rapid changes in market volatility or other conditions may lead to unmanageable price changes. Private options may involve counterparty risk, essentially credit risk that the seller of the option cannot pay as called upon. In other words, dealing in futures and options may require a new expertise for the company's investment function.

Insurers can estimate capital market risks through modeling, and may in some cases be able to use hedge strategies to offset some or all of the risk. However, the cost of a capital market option depends on the degree to which policyowner behavior (surrender, fund allocation, etc.) is affected by ownership and the value of the option. Option pricing models assume that the option owner will use the option to his maximum advantage, but insurers often assume less than maximum utilization. There may be other reasons that the policyowner does not utilize an option, such as conflicting benefits (for example, there may be good economic reasons to surrender a policy even though it means loss of a guaranteed benefit), or policyowners may not be aware of the true value of the option or motivated to act.

The risks of incorrectly estimating policyowner behavior are compounded by the limited history of these types of benefits that would lead to any predictability of policyowner actions and the frequent concentration of sales through distribution firms that may recommend actions to an entire block of policyowners that may or may not be aligned with the insurer's interest. The emergence of secondary market firms to buy policies that are likely to have valuable payouts further compounds the difficulty in predicting policyowner actions.

Limits on policy designs, especially restrictions that lower the tail risk (the cost of extreme events) can significantly lower risks but are often not viable to sell or to gain

access to distributors in the competitive market. Product diversification can help balance risks but is not always a viable strategy, since many of the most popular benefits are based on the same market behavior and subject to the same risks.

Other major risks for non-traditional guarantees include regulatory, legal, and expense risks. Regulatory risks include risks of changes in reserve and capital requirements, which have had or will have a major impact on variable annuity guarantees and secondary guarantees on universal life, and changes in the tax code that might significantly change policyowner behavior. Market conduct and litigation risks exist for these products as they do for other insurance products. There are significant expense risks, including the risk of not hitting the sales volume anticipated when developing the product. High sales volumes are usually required to match the prices of competitors with large blocks of business. High sales volumes may also be necessary for some products for diversification or to create a large enough block to economically hedge.

Factored against all of these risks is the risk of deciding not to offer competitive non-traditional guarantees, which can have a major effect on sales or access to distribution outlets.

The following sections describe pricing and risk management methods, followed by other issues that may cause or mitigate risks. The best risk management approach is a comprehensive awareness of all of the risk factors and potential controls, similar on a product level to enterprise risk management at the corporate level.

2. Pricing and Measurement of Risk

2a. Profit and Risk Measures

As the attached survey shows, most companies use multiple measures for profit and risk, reflecting the company's overall financial goals, processes, and controls, and the specifics of the product.

I. Profit Measures

Profit measures include:

1. *GAAP Return on Equity (ROE)* is the primary corporate-level measure for most U.S. companies. Even if the specific pricing benchmark is based on a different measure, it is often necessary to demonstrate that corporate GAAP goals can be achieved by the product.

2. *Present Value (PV) of after-tax distributable earnings* is usually measured on a per-unit basis and discounted at an earnings rate. Internal rate of return (IRR), Return on Investment (ROI), and other variants compare different products in terms of their returns on corporate investment. Minimum standards reflect expected shareholder long term return on capital and implicitly bear a relation to GAAP ROE, although that relation is rarely cleanly demonstrable.

3. *Embedded Value* is the present value of profits discounted at a stockholder's cost of money rate, i.e., the market value of the business. The profits are cash available for dividend distribution, usually defined as after tax statutory profits plus surplus released. It is preferable to do stochastic rather than deterministic calculations for embedded value and both the collection of data and the modeling are complex. If experience varies from assumed, this is immediately reflected. Embedded Value measures are favored by institutional investors.

4. *Break-even year at which capital is recovered* is often a subsidiary measure to IRR.

Survey Results for Profit Measures

In determining the price and assessing the risks of non-traditional guarantees, many companies specified the use of multiple profit measures. For all three product lines, IRR and PV of profits were the most prevalent response. Specific results follow:

Annuities

The most common measure utilized by the respondents was the present value of profits, followed by IRR. Other common measures were ROI or GAAP ROE. A number of other profit measures were written in: Return on Assets (ROA), GAAP profit margin, PV of contribution to cover fixed expenses and overhead, statutory book profit, average statutory return on assets, statutory ROA, analysis of percentiles, hedging costs, and present value of profits as a percentage of present value of premium.

UL/VUL

For UL/VUL companies, the most common measure was IRR, followed closely by PV of profits. Other common measures were GAAP ROE and ROI. Other measures mentioned were: annual GAAP income, GAAP margin, present value of contribution to fixed expense and overhead, profit per thousand per year, present value of profit as a percentage of present value of premium, profit margin, breakeven year, embedded values, IRR using economic reserves, present value of distributable earnings, value added, and return on assets.

Term

Similar to UL/VUL company responses, the most common measures were IRR and PV of profits. Other common measures were GAAP ROE and ROI. Other measures written in were: profit margin, breakeven year (cited by 3 companies), embedded value, percentage of premium risk measures, present value contribution to fixed expenses and overhead,

profit per thousand per year, present value of profits as a percentage of premium.

II. Risk Measures

Riskiness is essentially the volatility or variability of results. Many risk measures, such as Net Amount at Risk, are relative in that they rank the level of risk. Others, such as Value at Risk, many surplus calculations, etc., are intended to be absolute, purporting to give a monetary projection of the risk. An absolute risk calculation is very difficult to validate against experience in the long-term insurance context, but even where the absolute value calculation may be uncertain, the relative value of such calculations is usually very informative.

Analyzing risks includes assessing the effect of risk as measured by rating bureaus or sources of capital. For example, S&P's quantitative assessment of risk is based on capital adequacy, liquidity, and GAAP earnings.

Risk measures include:

1. *Required capital*: Whether calculated by formula (regulatory RBC or internal company formulas) or by stochastic projection and discounting of losses, the calculated surplus required should at least be a good measure of the relative risk of different products sold by the company and ideally be a good absolute measure.

   Alternative definitions of surplus affect the calculation. "Surplus as Value at Risk" would be the amount which, when added to the reserves, equals the Value at Risk for, say 99 percent of losses. "Surplus as CTE90" involves taking the total amount of assets to cover the 10 percent worst cases, averaging them, and deducting the reserve. Conditional Tail Expectation (CTE) looks at the worst cases which may involve large losses that would be missed in the Value at Risk definition. "Modified CTE" variations only look at losses in the CTE set, i.e., excludes those cases where the reserve is sufficient to cover the costs, so that positive outcomes do not offset negative outcomes.

2. *Sensitivity measures*: Traditionally actuaries have identified the drivers of risk by sensitivity testing profits or other financial results in relation to underlying variables such as mortality, lapse, fund performance, expenses, etc. Ideally the change in the underlying variable has a measurable probability, i.e., one standard deviation, so that some likelihood can be attached to the outcomes. Sensitivity measures indicate where further examination of assumptions may be warranted

3. *Stress testing*: Stress testing is concerned with specific scenarios that are either of special concern for historical reasons or designed to illustrate a given characteristic of the product. Typically extreme lapse rates are tested both as representing the experience of a given subgroup (those who don't lapse, who lapse at the end of the surrender charge period) and of concern with product qualities (Are they lapse supported?). Extreme capital market variations, jumps or drops, are often tested, such as the New York 7 in asset-liability management work.

4. *Net amount at risk*: Net amount at risk is a classic insurance measure of exposure to claim, such as the amount by which guaranteed minimum death benefits are underwater, meaning the amount which would be payable in addition to the surrender value were a claim to occur at the time of measurement. Where the probability of claim or options exercise is difficult to estimate, this type of measure is useful. Exposure alone, without some calculation of the likely claim payout, may give a distorted view of the likely cost. However, exposure is often much easier to calculate than claim totals and may prove a useful indicator of relative risk early in the product development process.

5. *Value at risk*: The "at risk" factor can be cash flow, statutory income, GAAP income, embedded value, or similar measures. Given a certain probability, e.g., 95 percent, and time period, e.g., one trading day, the purpose is to state the maximum loss (the "at-risk" amount) within that time and probability. Thus, if a product has a GAAP income of $1 million "at-risk" over the next year within a 95 percent probability, there is a 95 percent probability that the GAAP losses, if any, over the next year will not exceed $1 million. When applied over a large basis and long time period, the calculations are daunting and the results may be difficult, or impossible, to verify against experience.

6. *Option-Adjusted Spread*: This risk measure is more frequently seen on the asset side, for example, the amount a bond is above Treasuries due to call or credit risk. The level of option-adjusted spread is generally perceived as a measure of the risk of the asset. This appears at the pricing end as a margin on assumptions, where riskier/more uncertain assumptions have a higher margin of conservatism.

Survey Results for Risk Measures

Many companies use multiple risk measures. Similar risk measures were used by companies for annuities, UL/VUL, and term insurance. Required capital and stress tests were both used as risk measures by most companies. A few companies also measure value at risk or embedded value at risk. Other measures written in were: CTE of book profits, statutory gain/loss in tail scenarios, stochastic minimum threshold, and average of worst 5 percent of present value of profits.

III. Incorporating Risk in the Pricing Measures

The basic ways of incorporating risk into the pricing measures are requiring more or less capital than the norm, setting higher or lower profit targets than the norm, or adding margins to the assumptions.

Requiring more or less capital: Where the required capital is set by formula and such formula is sensitive to relative risk, one can argue that risk is incorporated into the pricing model via the extra capital. Such formulas must fairly assess appropriate surplus across product lines, otherwise they may unfairly penalize some lines.

Setting higher or lower profit targets: Adjusting the profit targets for different products may be based either on some rough relative assessment or a complex scientific comparison of the risks for different products.

Adding extra margins to assumptions: Where the risk involves a given assumption, such as uncertain mortality or lapse in a new market, or possible anti-selection involving a new product feature, it is common to take a conservative view about that assumption.

Survey Results for Incorporating Risks in the Pricing Measures

In reviewing how companies incorporate risks for non-traditional guarantees into the pricing process, there was little difference in the responses for annuity and UL/VUL companies. For these companies adding margins to the assumptions or setting higher capital allocations are the common methods. While these techniques were used by the term insurance companies, responses were more evenly distributed among the three approaches outlined above. Results follow:

Annuities and UL/ and VUL

Most companies incorporate risk into pricing by either adding margins to the assumptions or setting higher capital allocations. Several companies set higher profit targets to reflect the risk. Other methods were also written in: cost of hedging, adding margin to the hedging cost, cost of reinsurance, including the cost of risk management, price set to cover 85th percentile loss, entering the additional cost into a deterministic pricing model, stochastic modeling, or reserve strengthening based on stochastic analysis.

Term

Companies were fairly evenly divided between adding margins to the assumptions, setting higher capital allocations, or setting higher profit targets to reflect the risk. Other methods utilized were : stress tests, conversion anti-selection costs built into the term premium, sensitivity

studies on lapse rates and interest rates, entering additional cost into deterministic pricing model.

Resources on Risk Measurement

Mueller, Hubert. "An Overview of Embedded Value." The Financial Reporter, November 2003, Issue No. 55, p. 23.

Ramenda, James. "A Public Market Perspective on Embedded Value." The Actuary. May 2004, Vol. 38, No. 5.

Sabatini, Frank and Thomas Conway. "A Brave New World: Risk Measurement and Capital Management in the Insurance Industry. Contingencies. January/February 2005, p. 44

Smith, Michelle. "Investor and Management Expectation of the "Return on Equity" Measure vs. Some Basic Truths of Financial Accounting." The Financial Reporter. September 2003, Issue 50, pp 34-40.

Internet Sources:
SOA Risk Management Task Force site: www.soa.org/sections/rmtf/rmtf.html has information on risk management and risk metrics, including definitions and applications. A SOA Risk Management Task Force survey of pricing practices was done in 2003. The results of that survey can be found in the Pricing for Risk subsection of the RMTF, at http://rmtf.soa.org/rmtf_pr.html. The SOA Finance Practice Area also has useful resources.

S&P conference: "Insurance 2004: Structuring for Success" at www.thehartford.com/higfiles/pdf/HIGSP_Insurance_2004.pdf

Papers from the 14th Annual International AFIR Colloquium at http://afir2004.soa.org

www.riskglossary.com has definitions of a wide variety of risk terms

2b. Assumptions

Many assumptions have to be set in pricing non-traditional guarantees, including the following:

- Premium payments including amounts and pattern.
- Partial withdrawals.
- Surrenders or lapses.
- Loan rates, utilization, and payback.
- Policyowner option utilization rates.
- Fund performance: Stochastic generation of fund performance requires the distribution of returns (e.g., lognormal), the variance, and the tendency to

revert to the mean. Performance early in a product's life can have a significant impact on guarantees and persistency. In many pricing situations, it is important that the performance of different types of funds (equity, fixed, etc.) be correlated for consistency of returns. Most financial textbooks discuss correlation matrices and their use.

- Asset allocation: Particularly important is assessing variable annuity options, which themselves may affect or constrain the allocation choices.
- Interest rates: Stochastic generation involves structure of rates, rate of mean reversion, spreads to Treasury and default rates, etc.
- Mortality rates are generally deterministic but some applications may warrant stochastic generation.
- Reinsurance rates, duration of reinsurance arrangement.
- Mix of issues across different time periods which may be very difficult to model with any homogeneity.
- Policy size distribution including the correlation of size with other policy characteristics (such as large size policies differing from smaller policies in terms of influence by third-party advisors).
- Age distribution: This obviously impacts mortality, but lifestyle changes and goals will cause differences in other factors such as fund allocations and utilization of options.
- Sex distribution.
- Distribution of qualified vs. non-qualified sales.
- Distribution of maturity dates for benefits.
- Annuitization rates.
- Sales, both in total volume and by cell.
- Expenses including developmental, fixed, and marginal. Many non-traditional guarantees are profitable not in themselves but due to overall additional sales. To assess such a value requires a sophisticated modeling of the expense, risk, and profit structure in relation to sales increases.
- Reserves: Relatively minor benefit adjustments or categorizations may have significant reserve impacts. Many non-traditional guarantees have statutory reserve requirements that are in the process of changing, and may be retroactive to inforce business.
- Tax deductibility of reserves.
- Tax rates, premium tax, and taxable income, the incidence of which may differ significantly from statutory gains and may have a significant impact on IRR.
- Required capital, which may be an internal company formula or RBC-based. Most pricing hurdles emphasize return on capital which highlights this factor. Emerging stochastic methods may give widely varying results for required capital.
- Discount rates:- Discount rates can reflect expected earnings on book assets, or may reflect the cost of capital (stockholders' expected long-term returns). The choice of discount rate can greatly affect the valuation. Care needs to be taken in pricing many non-traditional guarantees where losses appear at later

durations and may be deeply discounted where cost of capital type rates are used. It may be particularly risky if stochastic scenarios are being run since at least some will involve deep discounting losses and in some situations it may be useful to also discount at the earnings rate.

- Hedging costs including the costs of the hedges themselves, the administrative costs of running a hedging program, and the comparison of different hedging programs.

Some of the hardest assumptions to set for non-traditional guarantees are capital market performance and assumptions based on policyowner actions. Capital market performance generators are discussed under the section on modeling below.

Policyowner actions are not fully predictable and depend on a number of factors. Some policyowner actions are generated by changes in external conditions such as market performance, tax law and rate changes. Other policyowner actions are based on a rational analysis of the worth of policy options under these changed conditions or on more emotional reactions to the changed conditions.

Policyowner actions may also be influenced by distributors, both the original distributor and others, who may encourage the use of policy options or payments into the policy, or conversely, withdrawals or exchanges from the policy. In addition to distributors, secondary market companies may affect policyowner decisions about whether to keep their policies inforce. Lastly, media attention is an external factor that may have a significant influence on policyowner actions.

Besides traditional actuarial methods, Delphi techniques, which are based on informed opinions on future events, are used in developing assumptions. Future economic returns are one of the main variables where Delphi techniques have been used to develop assumptions.

In addition to stochastic modeling, which reflects variability in assumptions, companies may specifically test major disruptions or discontinuities in future experience, such as market crashes, major changes in tax law or regulatory requirements or changes due to actions of their major distribution outlets. The most commonly tested assumption under adverse state changes is the lapse rate.

Survey Results for Assumptions

Policyowner Action Assumptions:
Annuity and UL/VUL companies were asked to provide the source of their assumptions for certain policyowner actions. Almost all companies report that their source for withdrawal rates, lapse rates, premium deposits, fund allocations, and annuitization rates is from internal experience. About two-thirds of the respondents use actuarial judgment in addition to internal experience for withdrawal rates, lapse rates, and annuitization rates

and about one-half of the companies use actuarial judgment in addition to internal experience for premium deposits and fund allocations.

Very few companies responded using external data in setting assumptions. The majority of those companies that did respond to utilizing external data did so for determining lapse assumptions. Only one company mentioned using assumptions set by corporate parameters for lapse rates and fund allocations.

Assumptions under Adverse Conditions:
Companies were also asked to provide the adverse conditions for which they model lapses. Results follow:

Annuities
(out of 29 companies)
19 companies model lapses under adverse economic or market changes
4 companies model lapses under adverse distribution channel risks

UL/VUL
(out of 31 companies)
13 companies model lapses under adverse economic or market changes
3 companies model lapses under adverse distribution channel risks
1 company models lapses under adverse regulatory or tax changes

Term
(out of 31 companies)
3 companies model lapses under adverse economic or market changes
2 companies model lapses under adverse distribution channel risks

2c. Modeling

This section first outlines general approaches to valuation and then discusses stochastic versus deterministic calculation methods.

Most non-traditional guarantees are options (derivatives) in which the value (to the policyowner/beneficiary) is the result of the performance of an underlying asset in relation to a minimum standard. Thus options valuation approaches are necessary. A characteristic of options is that their value is rarely, perhaps never, directly proportional to the value of the underlying asset. This implies that a valid range of values of the underlying asset must be considered in projections valuing options and that averages alone are rarely adequate.

One can characterize valuation approaches for options under three headings:

1. *Real world or equilibrium models*. The "real world" approach attempts to project asset values and related cash flows as broadly and accurately as possible (simulate

the "real world"), discount appropriately for risk and cost of money, and thus arrive at an "accurate" evaluation of the option or asset to be valued. It is concerned with both the underlying asset values and the option-related decisions they generate. "Real-world" models are familiar and intuitively appropriate to most actuaries. They are also known as equilibrium models since they assume the world to be modeled is in equilibrium, i.e., it is stable enough that the assumptions and formulas can be used for projection. The discount rate used often includes a risk-premium or cost of money component to compensate for the risk inherent in the venture being valued. In short, when most actuaries use the word "model" they are thinking of real world models.

2. *Replicating or hedge portfolios*. If one can buy an asset portfolio which will replicate the cash outflow inherent in the benefit or option to be valued, the cost of that portfolio is arguably the value of the option, and certainly it is the market value of the option. Perfect hedges (constructs involving market-traded assets, usually index futures and puts and calls on futures, plus a balance of "riskless" assets) may not be readily available, but even imperfect hedges give an estimate of how the market views the cost of the option or asset being valued. We discuss hedging in more detail below. Note that hedges are essentially reserves in insurance terminology.

3. *No-Arbitrage or risk-neutral valuation models*. No-arbitrage theory and related concepts of option valuation are found in the world of finance and are increasingly prominent in actuarial literature as the existence and cost of options embedded in insurance products becomes apparent. For most actuaries the concepts, formulas, and applications are new, complicated, and most importantly, non-intuitive and need to be studied carefully before being applied.

   No-arbitrage models are simplified mathematical models by which values of assets underlying the options are projected using relatively few parameters, i.e., a risk-free interest rate, a dividend rate assumption, and an implied volatility assumption. The classic model is a binomial lattice starting with the current value of the asset and projecting N periods: two values at the end of the first period, four values at the end of the second period, potentially 2^N values at the end of the Nth period, and potentially $2^{N+1} - 1$ values over the total lattice. Each value becomes two values at the next date ("up" and "down"), with probabilities based on "Q-values". The up value is usually the current value multiplied by the implied period volatility, u, (standard deviation) of the asset value, and the down value usually the current value divided by the volatility. The up value times q and the down value times 1-q must equal the current value, so q (the Q-value) is set. Thus we have a lattice of future asset values against which to value the option. The parameters driving the lattice, dividend rate, and implied volatility are available for publicly-traded options, such as S&P 500 puts and calls. To the degree one can look up or calculate appropriate parameters for the underlying assets (such as VA funds or a subgroup thereof) one can create the appropriate lattice.

Some values in the lattice may occur multiple times. If there is full overlapping of values at each individual node, there are only (N+2) x (N+1)/2 total nodes for N iterations, instead of 2^{N+1} - 1 nodes, which is a vastly reduced number. In most stochastic simulations, the frequency of each path in the simulation set is assumed to reflect the frequency of that path in the world being simulated, which requires a large number of simulations to give a representative set. If another mechanism or formula is available to assess the frequency of a given path or result, the number of simulations may be dramatically reduced (i.e. "representative" paths or values may be multiplied by their "known" frequencies).

Starting at the "end" of the lattice one values the option based on whatever calculation rules are appropriate, allowing for current versus future exercise of the option and rolling each pair of nodal values into the preceding node (each node before the Nth period being associated with two future nodes) until a single value is derived at the "beginning" of the lattice. This recombining process involves discounting at a "risk-neutral" rate. Thus, the term "risk-neutral" is often used to describe these models. In this way the market view on volatility is incorporated into the option valuation.

Clearly this outline oversimplifies the process to a great degree. Correctly going through the recombining process for complicated options involving mortality and surrender such that the results are trustworthy requires a high level of understanding. Because the model is not always intuitive, one must be careful to understand the underlying mathematical theory in applying it. There are numerous texts and other sources available for those who wish to develop expertise.

Stochastic approaches are often substituted for the lattice because the number of calculations becomes unmanageable as the number of lattice periods becomes sufficient for purposes of accuracy. A random number generator can be used to develop a sufficient number of sample paths through the lattice. Each sample path generates a current value of the option. Assuming each path is equally likely, the average of the path values is the estimated value. Statistical methods are available to calculate the variance of the estimate.

Some options may be valued by mathematical formula rather than recursion through a real or implicit lattice. The Black-Scholes method for European options (exercisable only at the expiry date) is a prime example. Such methods have the advantage of relatively quick and easy calculation and the disadvantage of an inability to value most American options (exercisable any time before the expiry date) and options where complicated interim choices (such as surrendering the policy) are involved.

Real world models are as flexible as intuition and inventiveness can make them. They can be set up to give a range of outputs (e.g., surplus values and the implicit standard deviation), and matching the "real world" allows one to test the plausibility of assumptions, formulas, etc. using "common sense." Models as discussed below are real

world unless otherwise stated. A weakness of real world models, especially models of new options or covering new types of risk, is that the assumptions and formula relationships are often speculative and may be incorrect. In fact there may not be stability of assumptions and relationships implied by the term equilibrium model. For this reason, a second opinion from the marketplace is useful.

Valuing via determining the cost of hedging is very attractive since one could then purchase the hedge. The problem encountered is perfect hedges are rarely available for the complicated, long-term options issued by insurance companies (i.e., multi-year open market S&P puts rarely exist). However, the structuring of a less than perfect hedge portfolio and valuing the assets therein even if only in theory is a worthwhile exercise for understanding options risks, inherent costs, and future hedge options.

No arbitrage models are a way of incorporating marketplace volatility assumptions into options analysis and pricing. Frequently such models are used to assess hedging strategies on an ongoing basis, rather than a long-term pricing effort. They generally set a current option price but may not be useful for such exercises as determining surplus values, amount at risk assessments, analysis of profit drivers, and other values requiring a range of results.

Viewing the hedge portfolio cost and no-arbitrage model cost as second opinions to the real world model results seems to us a useful way of categorizing them. In theory there should be congruence at the "true" cost. More likely the results will differ, perhaps to a significant degree. In assessing the differences, the limits of each approach should be reviewed. In the case of the hedging and no-arbitrage approaches, there is likely to be a risk premium incorporated, the orientation is near-term, and policyowner actions may not be correctly represented (they do not always exercise the option).

Next we discuss calculation methodologies. The basic approaches to modeling are calculating assumptions on a deterministic or stochastic basis. An options pricing approach values policyowner rights under a broad range of future conditions, not just a set of expected averages.

Deterministic models evaluate performance based on set, usually average, assumptions. When deterministic models are used to price non-traditional guarantees, they often result in a zero or very low cost for benefits such as guaranteed death benefits when equity returns are assumed to be at average rates. The actual returns by policy can vary dramatically with the low returns generating costs to the company (which is covering minimum guarantees), and are not offset by the high returns. Thus, average returns understate the expense to a degree which often requires a stochastic model to evaluate. Deterministic models using extreme values or specific scenarios are useful to illustrate profit drivers, risk conditions and other aspects of the product. Deterministic testing can evaluate options costs given lattice structures or known probability distribution models (like Black-Scholes) where the full range of values, not just the average, is accounted for. However, the analysis of surplus, tails, and options valuation generally requires the use of stochastic models.

Stochastic models generate a large sample of (almost always) equally probable values for key variables using a random number generator. The profits and other values generated are seen as a valid sample from the universe of possible outcomes and can thus be used to show the range of costs, tails, and surplus value, and to price options. Stochastic models are useful when there are skewed risk distributions, skewed profit outcomes, interdependent or path dependent risks, significant volatility or the need to examine extreme risks or tail behavior. Usually capital market assumptions are stochastically generated and other variables which have substantial volatility may also be stochastically generated. By ranking the results, one can identify and further examine best and worst case paths and perform problem scenario analysis. It is useful to carefully document such results with the intent of building a library of analyses so that the stochastic modeling resource becomes more reliable over time.

Stochastic modeling is a new area for many companies. Developing the capability to perform stochastic calculations and effectively interpret them is an effort that will probably take several years to fully implement at most companies.

Some of the considerations in deciding when and how to do stochastic modeling include:

- The need for personnel familiar with stochastic and related capital market concepts and applications, or third-party resources who can economically supply the knowledge and judgment. The organization necessary to manage the multitude of runs implied by stochastic analysis is likely to require new skills or analysis, organization, and documentation. Most companies are familiar with stochastic techniques and practices through the requirement of asset-liability modeling and reserving on fixed life and annuity products and will probably build on that.
- The expense and time required to develop and run stochastic models.
- The difficulty of validating the model.
- The utility of the output and any difficulties in interpreting it.
- Stochastic models produce percentile rankings of the present value of profits, required surplus estimates, etc. To the degree such ranges of results are not informative, the expense of a stochastic model may appear unwarranted. Deterministic models are still the source of specific analyses, stress tests, etc. and are not fully replaceable by stochastic runs.
- When regulatory requirements such as RBC C-3 Phase II, rating bureau treatment or capital market access require or favor stochastic analysis.
- Whether the same basic stochastic model can be used for all intended purposes, such as pricing, cash flow testing, asset-liability modeling, GAAP valuations, embedded value or other economic worth calculations.

Stochastic models may need to be based on simple relationships between variables in order to have manageable run times and understandable output. However, to be realistic, stochastic models need to reflect a relatively high level of dynamic interaction between certain variables, including some variables controlled by policyowner actions. The

volatility of a result may be increased multi-fold when policyholder reactions are dynamic.

If the company has a plan to hedge or partially hedge against the guaranteed benefits, this may be included in the model if judged appropriate. If stochastic modeling is done for RBC C-3 Phase II, the regulations will specify the conditions under which hedging may be incorporated. Any modeling of hedges should reflect an awareness of the basis risk (performance mismatch between the fund(s) being modeled and the marketplace proxies being used) and price risks, as well as any gap risk (the risk that the market will jump between trades such as to leave a gap between the hedge assets and the liability being hedged).

There are five steps to creating and running a stochastic model:

1. Setting assumptions and parameters
2. Developing economic scenarios
3. Making modeling practical
4. Testing the reliability and validity of the model
5. Evaluating the output

Each step is discussed below.

Step1. Setting assumptions and parameters

Considerations in setting assumptions are described above. One or more of the assumption values may be stochastically generated where future values of the variable are determined by formulas that include terms based on a random number, representing the volatility (uncertainty) of such values.

Some assumptions may vary dynamically in the stochastic model, interacting by taking on different values in relation to other values. Some experience factors are highly likely to vary dynamically, such as withdrawal rates vs. market performance for variable annuities with guaranteed benefits. It is difficult to predict, estimate, and reflect all types of interactions in modeling, but as modeling techniques become more sophisticated companies are adding more dynamic interactions to their modeling.

Determinations must be made about sample groupings and other parameters. Groupings have a major effect on both the complexity of the model and the accuracy of the modeling, and need to be selected with extreme care. Where a set of pricing cells is being generated, the cells must be sufficiently specific to reflect the main assumption drivers.

Where risks co-vary, multi-risk stochastic analysis or stochastic-on-stochastic runs may be appropriate, with correlation coefficients needed.

The projection period needs to be sufficient to cover the time horizon when there are significant costs. The projection frequency should be set as necessary to reflect the financial dynamics of the product. In some cases, annual frequency may suffice but many practitioners feel that monthly simulation of capital markets is almost always necessary.

Survey Results for Step 1

Annuity and UL/VUL companies were asked to indicate the assumptions that vary dynamically in stochastic modeling. Responses follow:

Annuities

Assumptions which vary dynamically within the model
(out of 29 companies):

21 companies - lapse rates
13 companies - withdrawal rates
8 companies - annuitization rates
3 companies - fund allocations
1 company - premium deposits

Also written in were expense/average size inflation, and crediting rates/reserves

UL/VUL

Assumptions which vary dynamically within the model (out of 31 companies):

13 companies - lapse rates
3 companies - premium deposits
2 companies - withdrawal rates
2 companies - fund allocation
Also written in were interest rates

Term insurers were asked if mortality was stochastically generated. Out of 31 respondents, 5 companies reported using stochastic simulations of mortality.

Step 2. Developing economic scenarios

For modeling products with non-traditional guarantees, economic scenarios need to be generated for either equity rates or interest rates or both, with interactions between equity and interest rates included where appropriate.

There are a number of commercial economic scenario generators which may be purchased. Another source is the American Academy of Actuaries 10,000 scenarios developed for RBC C-3, Phase II, which are based on a fifty-year validation period. Many companies use internally developed generators which are fitted to a probability distribution, generally based on historic parameters. Generators commonly assume that the natural logarithms of equity rates are distributed randomly with a normal distribution. Regime-switching models add historical verisimilitude by switching randomly between periods of high and low growth and volatility. Usually, only two regimes are needed to match historical criteria, especially the "fat tails" inherent in historical experience, as opposed to single regime lognormal results. Non-normal distributions are also possible but not widely used. Interest rate models commonly assume that the randomly-generated rate tends to revert to a mean rate; equity models may also assume such mean reversion. Mean reversion assumptions may underestimate low-probability extreme events over long periods of time.

Economic scenario generation is a difficult and subtle process. Not only must specific equity and fixed instrument assumptions validate to the appropriate history but they must be internally consistent. Generated equity scenarios must be carefully validated at both the initial point and other points in the projection period. Validation methods are commonly based on validating against historic parameters, testing the mean, variance, and average accumulations of funds. Additional validation benchmarks and tests against the indices are frequently used, such as matching a certain number of crashes (i.e., drops of more than 10 percent in the index within a short period such as a week) or other patterns which are mathematically definable and of interest to the modeler. For use for RBC C-3 Phase II calculations, calibration and other requirements of equity scenarios are prescribed.

Where products offer multiple fund investments, funds may be grouped for modeling based on their fundamental characteristics. Such grouping should be tested so that no grouping results in increased return without correspondingly increased risk and the correct variance and return characteristics are retained. The grouping of funds should also not create more apparent diversification (lower variance or beta) than actually exists. Typically the funds grouped together are modeled by a proxy fund with characteristics that are a combination of market indices representative of each fund.

Interest rates can be modeled either based on corporate models or using implied forward rates from the swap curve. If a product allows investment in either equities or fixed accounts, each must be modeled using the appropriate and consistent equity or interest rates.

Investment expenses must be reflected in the scenarios as appropriate.

Survey Results for Step 2

Out of a total of 29 annuity respondents, 25 companies indicated performing stochastic modeling. Additional questions were asked about the models and methods used. Results are shown below. Since some companies provided more than one response to a question, the number of companies responding to each question may be greater than 25.

Source of stochastic models:

19 companies use stochastic models developed internally
10 use commercial models
6 use consultants

Source of equity and/or interest scenarios:

17 companies use internally-generated scenarios
8 use commercial vendors
3 use consultants
2 use AAA scenarios

For producing equity growth rates:

18 companies use log-normal methods
7 companies use regime switching
6 companies use mean reversion
No companies report using non-normal methods

Number of scenario sets:

There was some difference in the responses of "top 25" and "non-top 25" companies.

"Top 25" companies generally used more than 5 scenario sets representing different subaccounts. "Non-top 25" companies used 5 or less.

"Top 25" companies typically used 1,000 scenarios in each scenario set, with one company using up to 10,000 scenarios. "Non-top 25" companies were equally divided between those who used 100 scenarios and those who used 1,000 scenarios.

Validation method:
The most common validation method was historic parameter matching, cited by 13 companies. 6 companies match on historical results, and 4 companies match major historical patterns such as market crashes or periods of high or low returns. Some of the "top 25" companies listed other validation methods: dividend discount theory, calibration to capital market assumptions, C-3 Phase II calibration, volatility closer to implied value than historical value.

Validation period:
"Non-top 25" companies listed validation periods between 15 and 30 years. "Top 25" companies typically listed validation periods since 1926 or based on all available history.

Step 3. Making modeling practical

Run-time is generally an issue for most stochastic simulation, especially where used in conjunction with a hedging program. Run-time is affected by the number of scenarios used and the interactions between variables. There is a trade-off between manageable run times and accuracy of projections. Some companies reduce the number of scenarios through various algorithms or testing of representative subsets or use stratified sampling techniques. Basically the methods involve finding a sample path to represent a larger group of paths, i.e., the average of the larger group. With technological advances or increased use of distributed processing, more sophisticated models with more scenarios will become practical to run. However, the amount and interpretability of output may prove more difficult with more complex models.

Survey Results for Step 3

Annuity companies were asked to provide the techniques used for scenario reductions. Most annuity respondents did not supply a response to this question. Of the companies responding, six companies use stratified samples intended to replicate the overall scenario. Two companies use the best, mean, or worst subsets (i.e., worst 5 percent, 10 percent). Other companies wrote in that they used: Langley-Cook, subset that replicates critical values, or 100 stratified samples plus 2 scenarios that produce minimum and maximum results.

Step 4. Testing the reliability and validity of the model

Validating the economic scenario generator is discussed above. Any other stochastic factors are validated as having the required averages, volatility, etc.

The random number generator must also be valid. Random number generators are widely available but vary in quality. Any flaws in the random number generator can invalidate the model. Therefore, it is important to use a reliable random number generator or test the generator for flaws. The RBC C-3 Phase II project used the Mersenne Twister, a relatively simple to program algorithm.

Any unusual results produced by the model must be thoroughly analyzed. The groupings into cells needs careful review that the simplification has not disguised significant results.

Since any errors may be compounded in the modeling process, the review stage is very time-consuming. Part of reliability is creating a documented library of results developed over time.

Step 5. Evaluating the output

Stochastic results are in the form of distributions of required capital or other factors. The analysis of stochastic results includes looking beyond mean results and analyzing the distribution. Prices can be set based on mean costs plus the cost of capital or to cover some portion of the distribution such as 60-70 percent.

Analysis of stochastic results include:

1. Percentiles, ranking results from the lowest to the highest.
2. Conditional tail expectations (CTE), the average of results of the worst 10 percent, 20 percent, etc. CTE measures are designed to reflect extreme values in the tail, capturing situations where tail results increase exponentially. Modified CTE measures, such as proposed under RBC C-3 Phase II, are the same as CTE measures except that only loss scenarios are used.
3. Mean-variance analysis, comparing mean-variance pairings and ranking in terms of attractiveness. Efficient frontier, a method of selecting asset portfolios, is the best known in this category. A basic view in financial analysis is that higher returns are associated with higher risks, and any results which violate this rule should at least be viewed with caution.
4. Analysis of extreme situations. Problem scenario analysis is the most commonly used term. Such analysis hopes to identify the attributes that led to the extreme results in hopes of avoiding or minimizing it.
5. Determination of value or earnings at risk. Can also be used as a method of grouping outputs, for example 95 percent, 90 percent ...5 percent Value at Risk values may be useful.

Stochastic runs generate large volumes of data. Many of the above analyses are simply different ways of summarizing that data. It is useful to present several such summaries giving different perspectives.

Analysis should include testing that cells are self-supported. For non-traditional guarantees, one of the tests usually necessary is to test that all higher age groups are self-supporting. Tests also need to be done to check for any lapse-supported results.

Any analysis of stochastic results needs to also consider the following:

- Whether there are any technical flaws in the model.
- Whether the level of simplicity in setting model parameters and interactions has fairly captured the characteristics of the business.
- What the model leaves out. Other parts of this paper cover some possible state changes, such as increasing activity of secondary markets, increasing use of patents, increasing partial 1035 activity, lawsuits, and other factors that might be outside the scope of the model parameters but could have dramatic financial results. The model results will not represent financial reality unless the modeled results are consistent with actual experience, including changes brought about by the marketplace, regulatory, tax, legal and other factors.

Resources on Modeling

Record of the Society of Actuaries

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Robbins, Douglas. "More Efficient Monte Carlo Simulation for Mortality Assumption Testing." The Financial Reporter. June 2003, Issue No. 53, p. 20.

Vilms, Andres. "Principles of Capital Market Modeling." The Financial Reporter, September 2003, Issue No. 54, p. 24.

Vadiveloo, Jay and Charles Vinsonhaler. "Pricing for the Volatility Risk of Traditional Actuarial Risks." The Financial Reporter. March 2003, Issue No. 52, p. 12.

Internet Sources:
SOA Risk Management Task Force website at
http://www.soa.org/sections/rmtf/rmtf.html
has a great deal of useful material, including an Equity Modeling recommended reading list, material and references on Extreme Value Models, and a project on Policyholder Behavior in the Tail which is not yet available.

SOA Investment Section on the SOA website (www.soa.org) has material including "Modeling of Economic Series Coordinated with Interest Rate Scenarios" and "Regime Switching Equity Model Workbook"

American Academy of Actuaries set of 10,000 scenarios
http://www.actuary.org/life/x_phase2.htm

Papers from CIA 2003 Stochastic Modeling Symposium
http://www.actuaries.ca/meetings/archive_stochasticsymposium_2003_e.html

Presentation materials from SOA and Annuity Systems Inc., First Annual Equity Based Insurance Guarantees Conference
http://www.magnetmail.net/images/clients/ActuarieCE/attach/FinalBinder.pdf

Annuity Systems Inc. online paper, "What You Need to Know About Managing VA Risks" by Dr. L. Ravindran
http://www.annuitysystems.com/extras/DynamicHedging_25Jun04.pdf

3. Corporate Issues and Strategies

Companies may address risks through various corporate strategies, including Enterprise Risk Management, reinsurance, hedging, product balancing, or securitization.

3a. Corporate Risk Management

Companies may do risk position reporting, measuring liability risks, asset risks, asset/liability risks, operational risks, reputation risks and other risks. Enterprise Risk Management (ERM) is becoming more prevalent as a tool to respond to financial, market, and regulatory conditions. ERM centralizes and develops a connection between all risks, including market risks, credit risk, operational risks, and mortality risks. Risks are measured consistently across the company, although there are complex problems to confront in aggregating risks and allocating risks to various business units. A risk budget or risk tolerance may be established corporate-wide. Effective ERM requires building this approach into the corporate culture and aligning incentives and bonuses with the risk management system.

Survey Results for Corporate ERM

Out of a total of 33 companies, 28 do corporate-wide enterprise risk management. Of those that responded, the following company representatives oversee the ERM process:

13 companies have the Chief Financial Officer in charge of the risk management
11 companies use a Corporate Risk Manager
1 company uses the Chief Actuary
1 company uses the CEO
1 company uses an Executive VP
1 company uses a committee of top executives

Resources on ERM

A good bibliography for Enterprise Risk Management is found on the SOA Risk Management Task Force website at www.soa.org.

3b. Reinsurance

Reinsurance may be used as protection against risks or for balance sheet reasons. Reinsurance, both domestic and offshore, has been used as a support for many types of non-traditional guarantees.

Variable annuity guarantees, especially the death benefit, were originally supported by several reinsurance outlets. As the potential risks of these guarantees increased with lower and more volatile market performance, the market for reinsurance basically disappeared. "Partial tail" coverage remains available, but without covering the full tail risk the RBC is changed very little.

For UL and VUL guarantees, reinsurance has been used for reserve relief, often offshore or with offshore captives, or domestic reinsurance with retrocession to offshore. For products with XXX or AXXX/Guideline 38 reserves, reinsurance has been used with letters of credit or funded reinsurance trusts to establish reserve credits. For secondary guarantees on UL or VUL, the majority of the net amount at risk is transferred to the reinsurer. There are no reinsurance charges when the secondary guarantee becomes effective, so the reinsurer holds the excess reserves. Both the capacity and the cost for this type of reinsurance coverage may be uncertain in the future.

Reinsurance does not provide elimination of risk. With reinsurance there remains many risks such as the risk of non-renewal or change of reinsurance or letter of credit terms, the risk of reinsurer insolvency, the risk of changes in regulatory treatment of reinsurance, or non-recognition of the letter of credit or reinsurance.

Survey Results for Reinsurance

Companies were asked to indicate if they used reinsurance and/or off-shore solutions as part of their risk management of non-traditional guarantees. Results follow:

Annuities

Use of Reinsurance

Top 25	Non-Top 25	Use of Reinsurance?
5	2	Use reinsurance as significant part of risk management program for non-traditional guarantees
6	11	Do not use reinsurance
4	1	Did not respond to question

Use of off-shore solutions (One company responded to utilizing two solutions)

Top 25	Non-Top 25	Use of Off-shore Solutions?
5	2	Use off-shore solutions for reinsurance
1	0	Use off-shore solutions for financial reinsurance
8	12	Do not use off-shore solutions
2	1	Did not respond to question

UL and VUL

Use of Reinsurance

Top 25	Non-Top 25	Use of Reinsurance?
11	2	Use reinsurance as significant part of risk management program for non-traditional guarantees
5	9	Do not use reinsurance
0	4	Did not respond to question

Use of off-shore solutions

Top 25*	Use of Off-shore Solutions?
5	Use off-shore solutions for reinsurance
6	Use off-shore solutions for financial reinsurance
9	Do not use off-shore solutions

* Of those companies participating in the survey, no "Non-Top 25" company reported using off-shore solutions.

Term

Use of Reinsurance

Number Responding	Use of Reinsurance?
19	Use reinsurance as significant part of risk management program for non-traditional guarantees
5	Do not use
7	Did not respond

Use of off-shore solutions

Number Responding	Use of Off-shore Solutions?
5	Use off-shore solutions for reinsurance
4	Use off-shore solutions for financial reinsurance
17	Do not use off-shore solutions
7	Did not respond

Resources on Reinsurance

Burden, Juliette, Gary Kelly, and Bradley Smith. "XXX Implications." Reinsurance News, August 2004.

Levine, Joel. "Hidden Credit Risks of Regulation XXX/Guideline AXXX Reinsurance Programs." Moody's Investor Services.

3c. Hedging

A hedge is a balance sheet or income item (usually an asset or revenue item) which offsets changes, usually arising from market forces, in another item. The term may also be used for a trading strategy, product feature, or other alternative to achieve the same offsets. Hedging mitigates economic risk. Other reasons for hedging include situations where hedging is looked on favorably by rating agencies or where regulations encourage hedging through requiring lower reserves or capital if a hedging strategy is implemented, such as under RBC C-3 Phase II.

Running a hedging operation is potentially a complex activity requiring a detailed knowledge of the trading instruments and markets, the ability to do complex projections on a timely basis and a theoretical and practical understanding of the risks. Implementing

a hedging strategy usually requires much time and substantial back-testing (testing of how the hedge would have performed in historical periods) of the hedge strategy. Commercial systems and consulting support and products are available for all or part of the hedging implementation and execution. Some companies run the hedging operation as a separate business center responsible for profits of the hedging results.

It is generally useful to understand the potential hedges and hedging costs of product designs even if there is not an intent to follow a hedging strategy. Since a hedge is an ideal economic reserve, the cost of maintaining a hedge program is the cost of the benefit being hedged. Projecting such a program and its cost may be the best way to price such a benefit. It may also offer a reality-check against other pricing results, i.e., if the projected hedging cost is much higher than the other pricing results, what does this say about the other pricing results?

Static hedging is the purchasing and holding of suitable options. The options are likely to be customized long-term options purchased from co-parties. Thus, static hedging is potentially expensive, requires critical mass to be attractive to the co-party, has no liquidity, and is exposed to the credit risk of the co-party. Dynamic hedging involves actively trading, usually of publicly-traded short-term futures and options to maintain desired balances between the liability and asset characteristics. Dynamic hedging does not have known costs at the time when it is implemented, but it may prove to be cheaper than static hedging since it covers the actual volatility rather than the estimated volatility. Dynamic hedging is more complex to manage than static hedging, offers more liquidity and carries the risks that the instruments being used are not always available or not available at desirable prices or at the exact times needed. In practice, hedging may require a combination of static and dynamic approaches. How dynamic the hedging is will depend on the frequency of trades, the number of characteristics to be matched, and the closeness of match to be achieved. Obviously, there is a tradeoff between costs and diminishing returns.

Different levels of hedging ("the Greeks") are:

> *Delta*: Delta hedging is first-level hedging (comparable to duration hedging against fixed interest rate movements). The delta is the change in value of the liability in proportion to a small change in value of the index or underlying funds. When calculating the values of the liability at the current index level and at a one percent higher level of index, the change in value is the delta of the liability relative to the index, i.e., if the liability decreases by one-half percent then the delta is negative 50 percent. A block of assets which is 50 percent short on the index future will have the same delta and will offset small liability changes arising from index movements.
>
> The calculation of the liability values will involve stochastically generating values of the index, projecting the related benefit flows and discounting back at reserve interest rates. The policyholder lapse and other activity assumptions should be dynamic. Dynamic delta may be a multiple of "static" delta, where not only does the benefit value increase but utilization of the benefit increases. These calculations must

be done with sufficient frequency to capture the "current" state of the policy portfolio and level of index to the degree that the delta value is significantly impacted by either.

As the index value changes, the delta of the liability will usually change. For instance, as underlying funds (and the index values) decline, more guarantees become effective. The liability for the guarantees increases and becomes more sensitive to index changes (greater absolute delta values). The assets, consisting of interest-bearing assets less the liability for the short-sale of the index futures, must be adjusted to track both the higher liability and the higher absolute delta. If the hedge is working, the funds for this adjustment will come from the additional short sales of the index needed to rebalance the assets. These additional sales can be thought in terms of three categories, (1) adjusting for the "loss" due to the lower index value; (2) adjusting for the higher liability amount; and (3) adjusting for the higher proportion of assets constituted by the short sales to reflect the higher absolute delta.

The limits of delta hedging are that frequent trading may be required to track changes in the underlying index and even with frequent trading sudden market movements or limited liquidity during times of crisis may defeat the effort to maintain a match. Conversely a portfolio where the liability delta changes relatively little in relation to underlying index changes may be a good candidate for delta-only hedging. This type of analysis can be done in the product design stage by the projection of hedge requirements.

Gamma: Delta-only hedging predicts the change value of the liability for small changes in the index. If there are large index changes between hedge updates, the delta of the liability may have changed significantly and the rebalancing of the asset portfolio may require that significant funds be injected. An asset portfolio which changed delta in parallel with the liability portfolio would offset this mistracking to the degree it was due to changing delta. Such an asset portfolio would be gamma-matched, where gamma is the change in delta associated with a change in the index. Gamma matching requires options on futures since the futures themselves have a gamma of 0 (their delta is always 1). Gamma matching is more complex and expensive than delta hedging for several reasons:

- Options are naturally more expensive since the seller of the option requires a risk premium.
- Matching options may not be available so the likelihood of mismatch is greater.
- Option values change over time to expiry, due to discount rate changes or due to market volatility changes and these must be tracked at some level (see "higher" levels of "Greeks") in order that the asset values not vary from the liability.
- Another level of calculations is needed to support the trading process.

Even where gamma matching is not considered feasible, it may be useful to keep a forward-looking track of gamma values as an indicator of potential difficulties in the

hedging effort. To the degree that pricing and design can differentiate high vs. low gamma designs, savings will be available.

Rho: Rho measures the change in the option price for a change in interest rates. The liability cash flows involved may run several years and the fixed interest component of the assets and the resulting discount rate can play a significant role in the value of the liability. Thus it may be important to look to the duration and yield curves assumed in the liability valuation.

Vega: Vega measures the change in the option cost for a one percent increase in the volatility of the asset price. High values of vega imply that options based on hedging strategies will be very expensive. Identification of high vega designs at the pricing stage is a method of minimizing future expenses.

Theta: Theta is the decline in the value of an option as it approaches expiry. Where the hedging strategy requires the periodic replacement of options, the theta value is a significant parameter.

The factors underlying a hedging program (delta, gamma, rho, vega, and possibly others) must be calculated on a timely basis to support the trading activity. This may mean overnight or even intra-day calculation if the market is moving quickly. These factors are practically always computed using stochastically-generated index paths of sufficiently large samples to be statistically significant. Furthermore, the deltas are likely to be significantly influenced by dynamically-generated policyholder activity rates. What all of this means is that the time of calculation is a significant factor, and scenario reduction techniques may play a major role, along with use of distributed processing.

Delta hedging may be carried on where the frequency of update is weekly, monthly or even less to the point where it is almost static hedging. The payoff for frequent updating depends on the change in liability delta as the index changes; if the delta changes fairly little then infrequent trading may suffice. This depends on the nature of the benefit, the state of the portfolio, and how the liability is calculated. More frequent hedging will increase the effectiveness but will increase the cost. Some companies test the hedging more frequently than they process trades, to keep the costs down.

An issue that may need to be addressed in hedging the risk from non-traditional guarantees is that many of the long-term guarantees do not match with over-the-counter derivatives. In determining the options to use for hedging, a least square fit between the funds and indices such as S&P 500, NASDAQ100, or Russell 2000 can be used.

In addition, calculation “errors” or mismatches can arise from subjective assumptions (e.g., policyowner activities), use of an index or group of indices to represent a group of funds, or using market instruments to hedge unusual options. The necessary hedge instruments may be lacking at the right price and the right time. Market gap risk is when the hedges cannot be bought or sold at the right time, and basis risk is when the funds hedged against do not exactly match the hedge risk. “Holes in the hedge” are when model

and basis error result in a liability which is significantly higher than projected. Jumps or drops in the index between trading periods may also require cash infusion in indices to catch up and get back in balance. To the degree derivatives are used as part of the strategy, volatility and other such factors inherent in derivative costs can drive prices higher than expected. Additionally, derivatives may expire without value and have to be replaced whereas futures have some value at the end of any cycle and can be rewritten.

Hedging may be impractical for smaller blocks of business. Even for large blocks of business, hedging is expensive not only for the costs of running the hedging unit and the cost of the hedges, but because a high degree of dynamic hedging implies high trading costs. Hedging costs can be much higher than originally estimated if the market volatility is higher than expected. Policyowner actions may affect hedging costs, especially lapse activity since hedging costs are very sensitive to lapse assumptions. Basically, any hedging program requires continuous evaluation of the cost-benefit of various levels of hedging and implementing a program accordingly.

Hedging occurs for different types of guarantees. The most familiar example of hedging in life insurance is asset-liability management on fixed interest products where assets are purchased which have an aggregate duration and convexity such as to offset changes in liability cash flows arising from changes in interest rates. Hedging of non-traditional guarantees is generally hedging of costs associated with the change in value of a stock market index or a block of equity funds. For Equity-indexed annuities the index (such as the S&P500) is the basis of the equity portion of the interest credit to the annuity. Equity-indexed annuities need to be hedged by definition and the design of the product involves detailed analysis of the hedging costs and programs.

With variable annuity guarantees one or more market indices are selected to correlate to changes in the value of the funds underlying the guarantees. Hedging variable annuity guarantees may be too expensive or the block of business and/or the loss or volatility potential is too small to hedge. It is also possible that some guarantees may have such a low delta that hedging is not worthwhile. As the portfolio status changes, the delta and gamma values may increase so as to make hedging necessary or worthwhile. Implementation of RBC C-3 Phase II may change the value of a hedging program.

UL policies with no-lapse guarantees may have hedges in association with the asset-liability management programs backing the UL reserves. Where the reserves, due to such guarantees, significantly exceed the surrender values, the assets for the excess can be of much longer duration if yields justify it.

Swapping the mortality and expense risk charge on variable products for a fixed stream of income is a hedging possibility which may prove attractive and simple to implement.

Many companies are willing to tolerate losses up to a certain level and no more, comparable to stop-loss reinsurance. Hedging tails-only is justified in such a situation if the cost of such a hedge is less than a full hedge and is a sufficient amount. Clearly if

normal hedging is difficult, tails hedging is going to be more difficult. There are two logical approaches.

1. Run a "full" hedge and then offset below the "stop-loss" level. Thus, if an option is available which is a pure hedge but only the worst 10 percent is needed, buy the option and sell back 90 percent of the option. Such a hedge program will be quite case-specific, depending on what is being hedged and the instruments available. One can conceptualize such programs where the market instruments are options on futures but clearly they need to be planned carefully, especially during the periods of high market volatility where such a hedge will come into its own.

2. Where there is a correlation between a market index level and the level of losses, puts can be used to hedge against such losses. As a simple example, if analysis shows that losses on a block will be unacceptable if the S&P Index falls below 80 percent of its current value, one can buy a number x of S&P puts with a strike price of $y such that x times ($y less 80 percent of the current index value) equals the level of losses to be covered. Such puts will have to be refinanced from time to time as they expire. Trading will be required to maintain the above equation as index values change and as the target loss to be covered changes due to recalculation, changes in the underlying business, changes in corporate goals, etc. Whether such a program is economically viable requires planning and simulation over a wide range of market conditions. The effectiveness of such a program will also depend on the strength of the correlation of the market index and the level of losses.

Survey Results for Hedging

Annuity and UL/VUL companies were asked various questions about their hedging practices. In analyzing the responses, the use of hedging is clearly related to the size of a company's block of business. Results are

Annuities:

Use of Hedging

Top 25	Non-Top 25	Use of Hedging?
9	3	Hedge equity related risks for non-traditional guarantees
4	11	Do not hedge equity related risks
2	0	Did not respond to question

Primary reason cited for hedging:

8 companies - reduce volatility of results
6 companies - cap losses
2 companies - minimize capital and reserve requirements
2 companies - improve ratings

Primary reasons cited for not hedging:
4 companies - cost
5 companies - lack of time or expertise to run a hedging program
2 "top 25" companies and 7 non-"top 25" companies: too small a block of business to hedge

Source of hedging program:
8 companies use internal resources
2 companies use commercial software
2 companies use consultants or other third-party resources

Hedging measures used:
11 companies use delta
6 companies use rho
5 companies use vega
4 companies use gamma

Separate profit center:
Only one company reports running hedging as a separate profit center within the company.

UL/VUL:

Of those UL/VUL companies participating in the survey, no companies reported using hedging. Primary reason given by the companies is that their blocks of business is too small. Other reasons given is lack of time or expertise to run a hedging program, cost and the lack of availability of appropriate hedges.

Resources on Hedging

Mirsepahi, Edward. "Hedging Variable Annuities in the Capital Markets - A Dealer's Perspective." The Actuary. Vol. 2, Issue 2. April/May 2005. pp. 10-15.

Ravindran, K. Customized Derivatives: A Step-by-Step Guide to Using Exotic Options, Swaps, and Other Customized Derivatives. New York: McGraw-Hill, 1997.

"Dynamic Hedging." Record of the Society of Actuaries. Vol. 27, No. 1, Session 64PD. May 2002.

"Equity Products in Difficult Times." Record of the Society of Actuaries. Vol. 28, No. 3. Session 31PD. October 2002.

"Understanding and Managing the Risks Underlying Guaranteed Benefits in Variable Annuities." Record of the Society of Actuaries. Vol. 27, No. 3. Session 160TX. October 2001.

Internet Sources:
The SOA Risk Management Task Force (www.soa.org) has information on the Greeks, applications, and references.

3d. Investment Strategies and Asset-Liability Management

Stochastic modeling may illustrate much of the asset and liability risks and their interaction. Investment strategies and asset-liability management can offer on-going controls addressing certain risks. Some of the non-traditional guarantees primarily create equity risks, such as guaranteed death benefits on VA funds, but some guarantees create more traditional investment risks, such as the risk of disintermediation under secondary guarantees on universal life.

Resources on Asset-Liability Management

Best resource for asset-liability management literature is:
SOA ALM Specialty Guide. http://www.soa.org/ccm/content/areas-of-practice/special-interest-sections/areas-of-expertise/asset-liability-management

3e. Product Balancing and Diversification

Companies attempt to create diversified risks with a balanced array of products, but this is not always possible. Most insurance companies have not found it possible to respond to the needs of their customers and distributors with a fully risk-balanced product portfolio, although some have developed benefits with a primary or secondary goal of hedging other risks.

Some products may offer natural hedges between each other. One example frequently cited is the variable annuity enhanced earnings benefit (EEB) and the other variable annuity guaranteed benefits, since the enhanced earning benefit increases with positive market performance and the other benefits are guarantees against market drops. At the right sales mix, these benefits may partially hedge each other. But there is not complete negative correlation at the tails. At very high fund performance, the cap on EEBs comes into play and at very low fund performance, the revenue for the benefit is at its lowest point. Variable annuities and equity-indexed annuities are also cited as possible hedges. If two products have opposite sign deltas from the same index, they are potential internal hedges where the liabilities will move in opposite directions as the index changes. Full hedging would require equal values of liability times delta and is not likely. Most variable annuity guarantees have negative deltas, and products which have extra payoff as the funds grow such as EEBs having positive deltas are natural hedges. The deltas will depend, among other factors, on the policyowner activities and may have little correlation to each other in fact. For instance, a group of policyholders who have lost money and not surrendered their contracts may move out of equities, locking in their guarantees and

creating a very low absolute delta. Whereas the group who bought positive delta options, being optimistic, are in equities and have a very high delta. As in any of these situations, careful simulation is necessary before the theoretical result can be relied upon.

Survey Results for Product Balancing

Included in the annuity company survey was a question regarding product balancing. Three out of the 29 annuity companies responded that they had created benefit guarantees with the purpose of serving as hedges to other guarantees. The benefits cited were EEB and GMDB.

3f. Securitization and Swaps

Securitization is selling a balance sheet or income item, typically with the intent of reducing risk. Ideally, the securitization leads to increased earnings, reduced interest rate risk, and more assets under management. Examples of swaps include selling future mortality and risk charges on variable annuities for upfront revenue.

Survey Results for Securitization and Swaps

The survey also examined the use of securitization, swaps, and/or structured settlements. From those annuity and UL/VUL companies participating, only 3 companies (all annuity) reported using one of these methods to reduce risk.

3g. Arbitrage

A company's portfolio may sometimes produce situations in which arbitrage by policyowners is possible. Arbitrage may also involve products from multiple companies. One target for arbitrage is the underwriting difference between life and annuity products. Arbitragers will purchase a single premium immediate annuity with borrowed funds, and use the periodic payments from the annuity to pay the premiums on a life insurance policy. In this case, there is arbitrage if the death benefit is greater than the loan amount plus interest costs. With increasing technology and information resources and the interest of some large capital sources, arbitrage may become more sophisticated in the future. Preventing opportunities for arbitrage must be a consideration when designing products with non-traditional guarantees.

B. Competitive And Market Issues

1. Distribution

Decisions on what guarantees to offer, what forms to offer them in and how to compensate for the sale are obviously critical for attracting and retaining distributors. Many guaranteed features have been created to meet the specific requests of distribution firms, and can be a critical issue in obtaining and retaining access to them. One factor in

evaluating the pricing of these guarantees is a realistic assessment of the likely outcomes of either a decision to offer the guarantee or not to offer the guarantee. Will the decision to offer a guaranteed feature lead to unnecessary concessions or risks or is it truly necessary for gaining access to distributors? Will the resulting business end up with the volume, quality and characteristics envisioned by the insurance company? Will a decision not to offer the guarantee result in reduced sales, reduced access to distribution or less favorable demographics of the sales? These are some of the most difficult questions to satisfactorily answer under the substantial market pressure facing insurers in this business.

The cost of distribution arrangements for many companies in this market has moved away from semi-fixed cost structures using affiliated distribution to variable cost structures using independent distribution, which changes the effect of sales on potential profits. Also, the sales and compliance activities of distribution organizations can have a major effect on the risks and outcomes of any suitability or market conduct investigations brought by the NASD/SEC or state attorney generals.

2. Market Share and Critical Mass

The marketplace for products with non-traditional guarantees is dominated by companies who have extremely large blocks of business and usually set prices based on their economies of scale. For example, for variable annuities, one-third of total sales in 2003 were produced by the top 4 companies, one-half of all sales by the top 7 companies, and 95 percent of all sales by the top 25 companies (source: VARDS data published in The National Underwriter, 2004).

Breaking into the market or increasing market share may mean pricing in anticipation of reaching critical mass. This can, of course, be an especially risky strategy. The target for critical mass has gone up dramatically in the past few years as the sales and inforce volume has expanded, but the list of top competitors has remained fairly small. A few years ago, the typical working assumption was that it took $5 billion of variable annuity assets to reach critical mass. The targets have risen significantly since then. The average assets of the “top 25” variable annuity companies is $27 billion, and for the top 10 variable annuity companies it is $49 billion (source: VARDS data published in The National Underwriter, 2004).

3. Competitive Environment

Any decision on entering a competitive market must consider whether there is a level playing field and whether the market favors or disfavors any particular company. Competitors are not all facing the same constraints and opportunities. Some of the most obvious issues are differences in financial resources and constraints, distribution, organizational capacities and administrative capacities. Some companies are under different accounting constraints, such as companies subject to the International Accounting Standards Board (IASB). One especially complex area is the treatment of reserves. There can be substantial differences in companies’ interpretations of ambiguous

reserve provisions and/or provisions in anticipation of potential changes in reserve requirements. For example, currently some companies believe that other companies are gaming shadow-fund reserves under AXXX.

Differences in reserving often lead to substantially different pricing results, with corresponding differences in the competitiveness of the product. If a company holds higher reserves than its competitors, usually its resulting book profits are lower. This is because the company can either set prices similar to competitors (and get lower profits per sale because of the higher reserve costs), or set higher prices to match their higher reserve costs (and perhaps have lower sales because of the higher costs). There are a few examples of the reverse, where companies have sometimes gained business or distributors by the perception that their higher reserves are soundly based while their competitors' lower reserves may not be as solid.

4. Commoditization

It is not difficult for a company to quickly gain fairly complete knowledge of a competitor's new product once it is in the market. Sources include:

- Information obtained from distributors who market products from multiple companies
- Information publicly available from corporate publications, websites, etc.
- Information available on request from state insurance departments
- Filings made with the SEC, found at www.sec.gov, under "Filings & Forms (EDGAR)"

Without a patent, there are few barriers to cloning a competitor's product. Because of this, and other competitive pressures, the trend is toward increasing commoditization. Companies who hope to get a market advantage through creativity alone do not have a sustainable advantage unless they have a patent on their ideas. Commoditization puts increasing pressure on having advantages in distribution, market share, and service to customers and distributors rather than product features.

5. Patents

Patents on insurance products are not yet common, but are an emerging trend which may have increasing competitive effects. Patents last for twenty years. Many insurance patents are on processing or technological features, but some are on core features, such as a pending patent on charging the cost of insurance (COI) as a percentage of assets for variable life insurance. As of October 2004, there are 139 patents granted and 224 patents pending which cover some aspect of annuities, and 15 patents granted and 33 patents pending which cover some aspect of universal life insurance (source: U.S. Patent Office website: http://www.uspto.gov).

Patents have effects on both the company with the patent and its competitors.
The company with the patent has the exclusive right to use what it covers. The company may choose to lease out aspects of its patented rights, or offer to provide patented

services to other companies on a third-party basis. Having the patent is not valuable unless it is supported by having an active intellectual property function to protect and maximize the usefulness of the patent.

The companies without a patent may find that they have to either pay a royalty to the company with the patent, or design their product with features and processes that do not violate patents. Companies selling products with non-traditional guarantees need to have a patent watch function to make sure they are not in violation of existing patents.

Survey Results for Patents

Companies were asked about their interest in obtaining patents on their nontraditional guarantees. A few of the "top 25" annuity and UL/VUL companies indicated pursuing patents. Responses follow.

Annuities:

4 out of 15 of the "top 25" companies have or are considering getting patents on any of these non-traditional guarantees or related features.

None (out of 14) of the "non-top 25" companies are considering getting patents.

UL/VUL:

2 out of the 16 of the "top 25" companies have or are considering getting patents on any of these non-traditional guarantees or related features.

None (0 out of 15) of the "non-top 25" companies are considering getting patents

Term:

No companies (0 of 31) have or are considering getting patents on any of these non-traditional guarantees or related features.

Resources on Patents

To search for approved and pending patents, go to the U.S. Patent Office website: http://www.uspto.gov

Bakos, Tom. "Patenting Insurance." Contingencies. July/Aug 2002., pp. 34-39

6. Exchange Activity

Inforce business can be a very profitable target for other companies, since the acquisition costs for obtaining business through 1035 exchanges may be significantly less than the acquisition costs for selling to new buyers. While this may create market conduct or reputation problems for the companies soliciting such business, it is likely to remain a viable strategy that is an ongoing risk for the original carriers. Even without specific

plans to target exchange business, the level of exchange activity is very high. Based on the authors' experience, in many areas, exchanges may represent 40 to 50 percent of a company's "new" business, such as exchanges from annuities past the surrender charge period. The resulting economic loss to the original insuring company can come from many sources, such as losing business that would have been profitable in future years, retaining business that is potentially less profitable (such as contracts whether the fund performance has been low enough to make the death benefit guarantee "in the money", or where the insured has declined in health), problems with distributor relationships, or increasing per policy administrative costs for a smaller retained block of business.

Exchange activity has traditionally been based on 1035 tax provisions, with the entire contract exchanged. The emerging possibility of exchanging part but not all of the contract (see Section 2.D.3 below) may cause dramatic and unanticipated changes in the future. This may cause economic losses for the issuing company if they end up retaining part of a contract with non-traditional guarantees, especially where designs leave a guarantee inforce even if funds are withdrawn.

7. Secondary Markets

Until fairly recently, the main market for third-party insurance settlements was viatical settlements for insureds who were near death. Now there are firms actively creating a secondary market for both life and annuity contracts for insureds who are not near death but who have had changes in health since policy issue and have surrender values which are lower than the economic value of their policy. Such firms are increasing in number and are attracting substantial institutional investments. These firms predict very high annual increases in business. They are making increasing efforts to educate distributors on the benefits of secondary market sales, and offer compensation benefits to the distributor at resale in addition to any renewal commissions. Secondary market or viatical settlement companies may purchase casualty policies to protect against insureds who live longer than they priced for.

There are arguments both for and against the appropriateness of a secondary market. Those in favor point out that most other types of successful financial instruments have an active secondary market, and that making the market more liquid will increase insurance sales. Those opposed to these transactions are concerned about the potential increases in cost for the insurance companies. Both sides claim that their position is in the best interests of the consumer.

It is estimated that more than 20 percent of policyholders over age 65 have policies whose value, adjusted for their health expectations, is greater than their cash surrender value (Doherty and Singer). The offers to such policyowners can be quite large on a lump-sum basis, up to 3 to 3.5 times the surrender value. Currently, settlement firms are pursuing clients with larger policies who have life expectancies in the 10 to 12 year range. Another market is variable annuity policies owned by insureds over age 65 with guaranteed death benefits that substantially exceed the surrender value, with a dollar-for-

dollar withdrawal provision on the death benefit. Offers for purchase of such policies are in the range of 10-15 percent in excess of the surrender value.

Increasing secondary market activity is a reality that must be considered in pricing non-traditional guarantees. It is not safe to assume that this secondary market activity will remain limited in scope or focus to the present activity. Any type of divergence between the real world financial value of a product and the actual cash-out value can become subject to secondary market activity. Some types of divergence may be prevented by appropriate policy designs, but many types of divergence are inevitable with underwritten products. Pricing and modeling of guarantees should take into account potential secondary market activity and its effect on lapses and the character of the persisting block of business.

Survey Results for Secondary Markets

Companies were asked to check items they believe have a significant probability (more than 50 percent chance) of occurring over the next few years and decreasing their expected profits on products with non-traditional guarantees. For annuity companies, out of the 29 companies responding, 3 cited changes in lapsation due to increasing annuity settlement activity. Similarly, changes in lapsation due to increased life settlement activity were cited by 8 out of 31 UL/VUL companies and 2 out of 31 term life insurance companies.

Resources on Secondary Markets

Examples of settlements and settlement terms can be found on settlement company websites, such as:

Coventry First: www.coventryfirst.com
Rumson Capital: www.rumsoncap.com
Legacy Benefits: www.legacybenefits.com

Analysis of the value of a secondary market for the life insurance industry: Doherty, Neil, and Singer, Hall. "The Benefits of a Secondary Market of Life Insurance Policies", found at www.coventryfirst.com/Wharton.pdf. This report was commissioned by Coventry First, a settlement company.

C. Corporate Issues

1. Ratings, Publicity, Reputation

1a. Ratings

Corporate ratings are obviously a significant factor in attracting and retaining clients and distributors as well as having direct effects on financial viability and costs of money. The risks of offering non-traditional guarantees can be one of the items examined closely during rating reviews. Any decisions made on non-traditional guarantees must take into account the potential viewpoint of rating agencies.

Survey Results for Ratings

None of the companies surveyed believe that their experience with non-traditional guarantees has had a negative effect on their ratings.

1b. Publicity

There has been much negative publicity surrounding aspects of non-traditional guarantees. Negative publicity has given heaviest coverage to fund problems (market timing and late trading), lack of adequate suitability standards for sales, lack of value of deferred annuities in comparison to other accumulation vehicles and company losses on variable annuity death benefits.

This negative publicity tends to be in major national publications. More positive stories tend to be found in industry publications and in industry rebuttals to negative publicity. The effect of negative media reporting for a product type or a specific company can have a major effect on policyowner behavior or distributor relations, but is hard to anticipate or control in advance.

1c. Reputation

The sale of non-traditional guarantees can result in positive gains in reputation for companies who are perceived as innovative or dominant in sales in a marketplace, or negative results due to publicity or rating problems. Reputation risk is a real risk of being in this market, although it is not quantifiable.

2. Operational Risks

Operational constraints are a perpetual struggle for companies in this market, both in the cost and time to bring a feature to market and sometimes in providing barriers to what can be administered. Operational costs are major factors for the smaller sellers in this business, since the major sellers price under significant economies of scale.

3. Third-Party Arrangements

Many insurance companies selling non-traditional guaranteed products use one or more third parties to support the manufacture or distribution of the product. Common third

parties are distribution firms, administrators, and fund groups. All of these third-party arrangements carry certain risks.

Third-party distributors may create direct or indirect market conduct risks for the insurance company, or may damage the company's reputation. Often the direct supervisory risk is controlled by broker-dealer arrangements. Independent distribution firms also create the possibility of mass rollovers of policies to other carriers. The insurance companies are especially vulnerable after the end of the surrender charge period. If there is a pending threat of mass transfers, there is often no good answer for the insurer that will retain profitable business and favorable distributor relations. A decision to not pay incentives to keep the business may likely mean that the business will lapse before becoming profitable. A decision to pay incentives to keep the business may mean both lower profits on the retained business and retaining only a small share or a less favorable share of the block of business. Any decisions must take into account market conduct issues, consumer issues, and the effect on long-term relationships with clients and distributors.

Third-party administrators (TPAs) may cause the same types of problems as is typical with internal administration, such as unexpected costs, delays, or service problems. In addition, there is the risk that the cost of the arrangement could escalate or the availability of the TPA could terminate, leaving the insurance company without good options. There are some calculations performed by the TPA, such as the calculation of 7702 limits, which are difficult for the insurance company to audit but put the company at risk if they are incorrect.

Survey Results for Third-Party Administration

Few of the responding companies use third-party administration: Only 2 out of the 29 annuity respondents and 2 out of the 31 term life insurance respondents used TPAs. Of these companies with third-party administration, none reported problems with the administration of their non-traditional guaranteed features. For the UL/VUL survey participants, none indicated utilizing TPAs.

Many companies use external funds as investment options under variable products. Performance of any type of fund, especially in comparison to market norms for that fund type, may have a major impact on policyowner activity. Any market conduct issues suffered by these external funds may also cause problems for the insurance company, such as damage to reputation or unanticipated rates of surrender. Market timing and late trading are two problems to have surfaced recently. Another potential risk is a failure of the fund to meet diversification requirements, which would put the insurance company at risk with its clients for compliance failure. Most funds do not come close to triggering diversification problems, but hedge funds may pose a problem. Hedge funds and other similar funds may also have problems with the timing and accuracy of interim valuations, and provision of continuous liquidity. Many external funds used by insurance companies are "mixed and shared" funds, incorporating money from multiple companies and multiple products. Participation agreements with the funds may control most of the

potential problem areas, but there may still be ramifications for one company based on actions of other companies.

In all cases of using third-party resources, the insurance company may try to get indemnifications under their contracts with the third-parties. However, extensive indemnifications are not typically part of most third-party arrangements.

4. Management of Existing Blocks of Business

Companies issuing products with non-traditional guarantees are generally companies who are major competitors in the marketplace and have achieved this in part by continuously responding to the market. This has typically resulted in multiple generations and variations of products with non-traditional guarantees. For these companies, any decisions on bringing new features to the market also involves decisions about what to do with similar inforce blocks of business. Most often the existing block of business is left untouched, but sometimes new benefits are granted to existing policyowners as well as new sales. Sometimes these decisions are affected by the contractual structure and terms of the existing products.

Survey Results for Management of Existing Blocks of Business

Annuities, UL/VUL and Term:
In reviewing the survey results, formal conversion programs, either into or out of a product with non-traditional guarantees, were uncommon and were generally rated as having little effect on switching existing clients into products with non-traditional guarantees.

D. Regulatory And Legal Issues

Legal and compliance functions are a critical part of controlling the overall risk of these products. Many legal issues have been discussed in other sections of this paper. Some of the most critical issues are:

1. Compliance

Insurers may often face difficulties in obtaining regulatory approvals of nontraditional guarantee products. Delays in getting the product approved for sale or in making any changes required for approval, often result in differences in product availability or product features by state. Such state product variations may be more expensive to the insurer to administer and will complicate the explanation of the product features to the consumer and the distributor. Independent distribution organizations may be reluctant to market a product that does not have widespread uniform state approvals.

Sometimes it might be unclear whether a product fits the definition of a security, or whether the product needs registration, requiring complex legal analysis or decisions to seek private letter rulings. Once approved, there is a substantial and expensive compliance function in maintaining the product. Many of the non-traditional guarantees are sold with registered products, which requires a carefully run compliance function for all of the parties involved, including the insurer and the distributor.

Survey Results for Compliance

Annuities, UL/VUL and Term:

Only one company reports seeking a private-letter ruling, concerning the tax status of payments out of an income annuity

2. Reserves, Accounting and Other Regulations

Many of the applicable reserve and accounting regulations are listed in Appendix 1. The most difficult issues on reserves and capital requirements are:

a. Where regulations are ambiguous;
b. Where companies in the industry are not interpreting regulations uniformly, such as differences in interpreting reserve requirements for shadow-fund UL products;
c. The increasing trend toward new regulations or guidelines being retroactive, applying to both inforce and new business. Most of the non-traditional guarantees are or have been subject to retroactive reserve and capital regulation. For example, the potential reserve changes for UL products with secondary guarantees and the RBC changes in C-3 phase II for variable annuity benefits, have major impacts on profitability of inforce for most companies, and will significantly affect future design decisions.

The timing of transitioning to 2001 CSO is also a complicated determination in relation to competitors' actions, and the lower limits for 7702 and for guaranteed charges will affect product designs.

Survey Results for Reserve Regulation

Companies were asked to check items they believe have a significant probability (more than 50 percent chance) of occurring over the next few years and decreasing their expected profits on products with non-traditional guarantees. Approximately half of the annuity and UL/VUL participants cited reserve changes as having more than a 50% probability of occurring. Results are shown below.

14 out of 29 annuity respondents cited reserve changes
14 out of 31 UL/VUL respondents cited reserve changes
3 out of 31 term respondents cited reserve changes

3. Tax

3a. Tax Law Changes

Future changes to tax laws applicable to policyowners may have significant effects on policyowner actions to keep funding policies, withdraw money, exchange contracts, terminate contracts or purchase new contracts. Some changes might create valuable grandfathered blocks of business but dry up new sales possibilities, and other changes might cause large outflows of money. Changes that are anticipated but not predictable as to specifics are changes to the estate tax, changes to retirement savings vehicles that may compete with annuities, partial privatization of Social Security, and changes or refinements to 7702. Other changes may not be specifically foreseeable by practitioners in the field but are likely at some point during the long inforce horizon of these products.

3b. Tax Exchanges

Exchange activity under section 1035 has long been a significant factor in the industry, heavily used by both policyowners and distributors to exchange contracts for better terms or new commissions. Any pricing has to take into account lapsation due to 1035 exchanges, both from individual action and from mass action of distributors or companies targeting exchange business.

For many years, it was commonly assumed that the entire contract needed to be surrendered and exchanged to a new contract under the 1035 provisions. However, in 1998 the IRS approved a partial 1035 under some conditions, and has approved 1035's into existing contracts. Product features now need to be tested against both the risks of lapsation due to 1035 activity and the risk of withdrawals due to partial 1035 activity. Certain policy features, such as a dollar-for-dollar reduction in the variable annuity guaranteed minimum death benefit for withdrawals, would be especially vulnerable to partial 1035 activity, leaving the company with the risk without offsetting revenue.

3c. Compliance As Life Insurance: 7702 issues

In selling life insurance, any insurer has to address 7702, although tests and compliance may be more complicated for products with non-traditional guarantees. Many technical areas remain unclear under 7702, including some transitional issues to 2001 CSO. 2001 CSO has 7702 limits that are 10-20 percent lower than the 1980 CSO limits, which may make certain product designs less attractive.

Companies frequently introduce new guaranteed features, which may or may not be made available to existing blocks of business. These updates may or may not be classified as material changes to the contract, or it may be ambiguous. Changes classified as material changes may trigger a change from the 1980 CSO to the 2001 CSO basis, thus changing 7702 limits.

Survey Results for Tax

Companies were asked to check items they believe have a significant probability (more than 50 percent chance) of occurring over the next few years and decreasing their expected profits on products with non-traditional guarantees. The large majority of respondents did not cite tax concerns as one of the items impacting future profits:

2 out of 29 annuity respondents cited tax law changes and 3 cited changes in 1035 activity due to partial 1035's
4 out of 31 UL/VUL respondents cited tax law changes
1 out of 31 term respondent cited tax law changes

Resources on 7702

Adney, John and Springfield, Craig. "Notice 2004-61: Guidance on Mortality under IRC Section 7702." Product Matters! March 2005. Issue No. 61, pp. 12-15.

4. Market Conduct Issues and Other Litigation Risks

Non-traditional benefit guarantees are generally complex product features and as such may face risks of inadequate or confusing disclosure or customer dissatisfaction through lack of understanding. Litigation risks include lawsuits on behalf of a particular client or class-action suits. The plaintiffs can be the buyer, the agent, the distribution firm, or in some cases another company if the product targeted exchanges. State and federal agencies may also bring investigations. Many of the non-traditional guarantees associated with variable products currently facing investigations into late trading and market timing. Suitability of product sales is also under review. While these investigations are not directly related to the non-traditional guarantees, they may have an indirect effect on the product, through expenses of complying with investigations or litigation, conditions imposed by any settlement agreements, or policyowner or distributor actions in response to the investigations or attendant publicity. Many law firms became sophisticated in the insurance area several years ago in bringing large class action suits against insurance companies marketing "vanishing premium" life insurance policies and utilizing similar types of sales presentations, and that legal expertise persists to seek out other market conduct issues if and when they exist.

Survey Results for Market Conduct Issues and Other Litigation Risks

Companies were asked to check items they believe have a significant probability (more than 50 percent chance) of occurring over the next few years and decreasing their expected profits on products with non-traditional guarantees. Very few companies reported litigation risks as an item with significant probability of occurring:

5 out of 29 annuity respondents cited litigation risks
3 out of 31 UL/VUL respondents cited litigation risks
1 out of 31 term respondents cited litigation risks

E. Designing Benefits And Charges

1. Determination of Benefit Provisions

Benefit provisions are usually initially determined by marketing goals, but the specifics of the provisions are refined during the pricing process. The profits or risks to the insurance company can be significantly affected by every decision on the provisions and every limit or restriction applied to the benefit. Limits on issue ages, or ages where benefits freeze, can be critical for profitability, especially since the age distribution of sales for many annuities with non-traditional guarantees is skewed toward older ages. Restrictions on fund investment choices, including fixed account choices, for certain benefits are also critical in controlling risks and achieving profits, but may not be marketable in some cases. As RBC C-3 Phase II is implemented, some design decisions will be driven by ways to lower capital costs, including designs that are more easily hedged or have caps that lower the risk in the tails.

Any testing of profits and risks should include a full analysis of how design decisions affect each pricing cell. Any possibility for gaming the benefit through design loopholes is also likely to be noticed and publicized at some point.

There is often a marketing cycle, where the specifics of a new benefit are at first not critical to market the benefit. Then when enough carriers are issuing similar benefits, it becomes necessary for others to match the provisions by offering guarantees with similar prices and terms. A prime example of such a cycle is the dollar-for-dollar withdrawal provision on the variable annuity death benefit. When these death benefits were first developed, the withdrawal provision of the death benefit was a feature that did not get much attention from distributors. But once dollar-for-dollar withdrawal became the common provision, it was a must-have provision to get certain distribution organizations to sell the product. Companies who wanted access to these distributors had to have the dollar-for-dollar withdrawal provision, even though by that time it was common knowledge that it was potentially very risky (a Wall Street Journal article exposing this vulnerability appeared early in the product cycle). It was not until enough distributors began to retrench the benefit that others could follow and not lose distribution access. So during a significant period of time, the basic dilemma facing insurers was to either sell something that produced uncomfortable risks, or not sell the product resulting in no access to the major distribution organizations and low sales. The result was that many companies ended up with a substantial block of variable annuities inforce with dollar-for-dollar withdrawal on the death benefit, even though most of them knew at the time of development that they did not want to take on such risks if distributors had not forced it. The risks have ended up producing lower insurance company profits in some cases, and secondary market buyers have emerged to buy up such business, making it even more unprofitable for the issuing companies.

The pricing of most non-traditional guarantees has to work with market realities that are similar to this case. Implicit in many pricing analyses is the assumption that the cost of not meeting distributor needs is greater than the cost of benefits with risks that exceed

comfort levels. In some cases pricing would be more realistic if this trade-off is explicitly analyzed.

2. Relation Between Expense and Revenue Basis

Often the competitive environment makes it difficult to sell a product where the basis of the charge or timing of the charge matches the expected expense. A prime example is the deferred annuity, which typically mismatches both the basis and the timing of charges in comparison to expenses. On the typical deferred annuity, a major expense is distributor compensation paid at issue based on a percentage of premium, and the major revenue source is an annual charge against assets (variable annuity) or the spread between earned and credited rates (fixed annuity). A front-end loaded annuity which matches front-end compensation paid has proven very difficult to sell in the marketplace, and most of the A share variable annuities have been sold through one distribution firm. Variable annuity share structures sold in 2003 were:

2% A shares (front-load)
72% B shares (surrender charge)
7% C shares (no surrender charge)
16% L shares (short surrender charge)

Source: NAVA. 2004 Annuity Fact Book. 2004, 3rd edition, p. 49.

This mismatch creates substantial risk, since it does not align the interests of the company, the consumer, and the distributor. One of the most significant risks to the insurance company is the financial incentive for the distributor to move a policy to another company before the first company has received its anticipated profits. Most companies have not found a satisfactory answer to this situation, since products with fully matched charges and expenses have consistently been difficult to sell.

Some guaranteed features have charges that are affected by the same factors as costs. For example, if assets decline on a variable annuity, an asset charge for a death benefit will produce less revenue, while the benefit costs will go up as the gap between the death benefit and the assets increases. Pricing and modeling must take this into account unless more protected designs are saleable.

3. Allocation and Labeling of Charges

Pricing models may lead to decisions on how much to charge, but such analysis does not indicate how to allocate the charges or what to label them. From the insurance company's viewpoint, the revenue generally is unrestricted in use regardless of what it is labeled. For example, a "mortality and expense risk charge" on a variable annuity becomes part of the insurer's general revenue flow from the product. Yet it does not specifically have to be traced and accounted as revenue to be spent on mortality and expense risks, except to the extent that it needs to be consistent with any regulatory representations made in approval of the charges. However, there can still be major effects from decisions on allocating and labeling charges.

The perceptions of the media or of distributors can be significantly affected by the names and the sizes of the charges. For example, the public perception would be very different for a variable annuity with a 100 bp risk charge and 50 bp death benefit charge versus a variable annuity with a 25 bp risk charge, 100 bp charge for sales compensation, and 25 bp death benefit charge, even though both products cost the same. Secondly, some charges have conventional names and limits that can make regulatory filings easier than trying to get the same charges approved with less-traditional names or allocations. Finally, based on past experience it is possible that future changes to reserves or tax laws may be retroactive and may have provisions that produce different results based on the classifications of certain charges or whether there are separately defined charges for different benefits. All of these considerations make it likely that most companies will try to be consistent with the practices of the majority where possible, although there may be advantages to utilizing different strategies in some cases.

4. Offering a Menu of Choices

Some guarantees are offered with two or more choices available to the consumer, such as a choice of period for the guarantee or different benefit choices for different prices. Such menus offer customization that can be of benefit to the client and the distributor. There are two primary downsides to such menus. One is offering choices that may lead to more sophisticated antiselection than has been incorporated into pricing. The other is choices can lead to confusion, which can harm the sales process, or worst case lead to disclosure or market conduct problems.

5. More Complicated Structures

Sometimes the guaranteed benefit can involve the sale of more than one product, even possibly products from different companies. Sometimes the guarantee is supplied by a non-life company. The legal, tax, and compliance issues of these approaches need very careful scrutiny.

6. Private Placements

Private placements are used to customize product features, price, and commissions for high net worth individuals or small groups. Often the products are simplified without complex features, and they may eliminate many of the non-traditional guarantees found in the retail market. Prices are set by cost negotiations, and each charge is usually closely matched to the actual cost, without any mismatch between the basis of costs and charges.

Private placements can be either domestic or offshore. Domestic products can be marketed directly to the client, but offshore products have the advantage of avoiding corporate premium tax and federal tax. Offshore products are still designed to qualify for tax deferral under U.S. tax law and are valued in dollars with the assets usually in a protected separate account. Most private placements involve independent fund managers and one or more third-party reinsurers. Fund issues can be especially complex for the insurer, since funds used may have limited liquidity or may be difficult for periodic

valuation or come close to non-compliance with diversification limits. Domestic products generally require liquidity quarterly, but offshore products can offer less frequent liquidity and use funds which are "locked-up" or hard to value during interim periods. Policy terms for any benefits, such as death, that take place on dates other than valuation dates requires care in designing to avoid risks due to lack of liquidity or any gap between when the contractual values are determined and when the asset values are realized through sale.

7. Semi-Guarantees

Some products have features that are sold similarly to guaranteed features, but the company reserves the right to change the feature, its price, or its availability. Often such reserved rights are difficult to exercise. In some cases, the contract may have specified these reserved rights but the marketing material is not as clear. In other cases, the negative reaction from clients or distributors is anticipated to more than outweigh the benefits of making changes. Any pricing that assumes that the company can exercise reserved rights should fully reflect the potential negative reaction to such changes.

Other features are contingent guarantees, such as a guarantee that stays in place as long as an external market condition is maintained, or a guarantee that is triggered on contingent events such as illness, unemployment, or college enrollment. These types of guarantees may be difficult to price where there is not a sufficient experience base for the rates of contingent activity.

Survey Results for Semi-Guarantees

Annuity and UL/VUL companies were asked if their non-traditional guaranteed features allowed them to change the price or terms of the benefits for inforce business. While approximately half of the annuity survey participants had such rights, only two UL/VUL companies responded to having these terms.

Annuities:

12 out of 29 survey companies reserve the right to change the price or terms of some of their guaranteed-type benefits for inforce business:

5 reserve the right to change the price or features of the variable annuity guaranteed minimum accumulation benefit, 2 reserve the right to change the price or features of the variable annuity guaranteed minimum death benefit, other companies reserve the right to change the price or features of the spousal step-up, commutation benefits, or enhanced dollar cost averaging accounts.

Out of the 12 companies that have reserved the right to change some feature of their guaranteed benefits, only one company has ever exercised this right, on the guaranteed minimum accumulation benefit.

Universal life:
Only 2 survey companies reserve the right to change the price or terms of some of their guaranteed-type benefits for inforce business, for UL premium or shadow fund guarantee benefits. Neither of these companies has exercised this right.

8. Disclosure of the Guarantee

Any description of non-traditional guaranteed benefits needs very carefully constructed language to protect the insurer against any possible unintended interpretations or utilization.

Benefits may be promised and disclosed in a variety of ways. Some typical ways of treating a guarantee are:

1. The guarantee is fully described in the insurance contract or in a rider;
2. The guarantee is partially disclosed in the insurance contract or in a rider, with more details disclosed in the prospectus;
3. The guarantee is not disclosed in the insurance contract or a rider, but is fully disclosed in the prospectus;
4. The guarantee is not in the insurance contract or rider but is found in illustrations or marketing material (this alternative is becoming rare in today's legal climate); or
5. The guarantee is made by a letter of understanding.

The choice of where and how to specify the guarantee needs to be based on many considerations, including:

1. The effect on the speed of regulatory approvals
2. The ability to customize the product for clients
3. Flexibility for the company to withdraw or redesign the benefit or change the charges for it
4. Antiselection possibilities
5. Market conduct issues
6. Regulatory or tax implications

There is no one answer which fits all situations. For example, offering a benefit as a rider may make it quicker to get the benefit to market, easier to customize the product for the client, and easier for the company to withdraw the benefit from sale if desired. But there can also be substantial drawbacks to the rider approach, such as increased antiselection or less control. If there are market conduct concerns, it can be difficult to prove that a rider was attached to the contract received by the insured, especially if the rider modifies contract provisions instead of supplementing the provisions.

Companies may offer different product guaranteed features and different price choices for product versions sold through different distribution outlets. Historically, such products may have had not only separate product forms but different prospectuses and product literature. In part in response to some market conduct concerns, there is an increasing trend to make the disclosure of all product variations more transparent,

sometimes by incorporating the disclosure of all variants in the same sources. There is not enough experience yet to anticipate how this might change policyowner selections.

F. Policyowner Actions

Policyowners face a wide variety of choices and options under products with non-traditional guarantees, either acting on their own initiative or from the advice of their advisor or other third parties. Insurance companies have limited experience for these types of products in anticipating what future choices will be made by policyowners, and limited protection against factors that may affect policyowner actions like media attention, regulatory investigations, or actions of firms seeking to influence policyowner actions. Obviously, policyowner actions have major impacts on profitability, and the range of anticipated results are tested in stochastic modeling but there is no certainty that the modeling captures the true range of results, the probabilities of the actions occurring, their interaction with other factors or all antiselection effects.

The amount of decisions that the policyowners make is quite wide-ranging, including decisions in:

- Purchasing a product.
- Electing optional benefits which are chosen at purchase, added after issue, dropped after issue.
- Exercising provisions of benefits.
- Adding premium.
- Withdrawing money through partial withdrawals, partial 1035s, loans, or annuitization, including when payouts start, stop or change in amount.
- Terminating the contract, through surrender, 1035 exchange, commutation, life settlement, viatical settlement, or annuity settlement.
- Maintaining the contract by the spouse after death of the contract owner.
- Bringing lawsuits.

The other parts of this paper describe issues in designing and controlling risks under these products, but none of these strategies are reliable unless the range and distribution of policyowner actions have been estimated well. As is described in the section on assumptions, there are not public sources for assumptions for policyowner actions that are usually relevant to a specific company's potential experience in this market, and most companies rely heavily on their own emerging experience on related products for future assumptions. In general, the ways to control risks from policyowner actions are the basics: test the risks and profitability of every relevant cell and with dynamically varying policyowner actions, make sure the product design prevents gaming or arbitrage, use distributors where there is a good strong on-going relationship, sell to suitable clients, have a strong compliance function, and provide excellent service and performance both internally and from any third-parties used.

Section 3: Company Experience

Most of these non-traditional benefits have been available for too short a period to have reliable industry statistics on company experience. The benefit that has received the most public and media attention is the death benefit on the variable annuity, which has been in effect longer than other non-traditional benefits. Death benefit costs in excess of values on variable annuities have been approximately:

$ .5 billion in 2001
$ 1.2 billion in 2002
$ 1.2 billion in 2003

[source: NAVA, at http://www.navanet.org/frames/press_dex.htm, September 28, 2004]

Survey Results for Company Experience

Annuities (out of 29 respondents)

Profits:

The following numbers of companies responded that their profits for some non-traditional guarantee benefits were lower than that assumed in pricing:

Total	"Top 25"	Non-Traditional Guarantee
14	9	GMDB
3	3	EIAs
2	1	GPAF
1	1	GMIB
1	1	EEB
1	1	Enhanced dollar-cost-averaging rates

Of those companies responding to lower than anticipated profits, the primary causes of the lower profits were (some companies checked more than one cause):

Cause	Number Responding
External market performance	12
Reserve changes	5
Administrative costs	3
Limitations of modeling at the time of pricing	3

Changes in benefits:

Companies were also asked about benefit revisions. Four companies responded that they ceased to offer versions of the GMDB which were rollups or had dollar for dollar partial withdrawals. Two companies also responded to discontinuing to offer GMIB.

Many reasons were cited for the decision to cease offering these benefits: loss or lack of reinsurance coverage, lack of hedging instruments, increased cost concerns, high utilization, low sales, equity risk, unacceptable tail scenario risk, high capital requirements, and market conduct concerns.

Very few companies anticipate reducing the benefit or ceasing to offer certain benefits for new business in the next two years. One company responded that it anticipates eliminating the GPAF while another indicated that it plans to eliminate the EEB. In addition, one other participant expected to eliminate a GMDB that is the larger of a ratchet and rollup. Reasons given for these actions are low sales, unacceptable tail risk, and too much volatility until a hedge program is in place.

UL/VUL (out of 31 respondents)

Profits:

The following numbers of companies responded that their profits for some non-traditional guarantee benefits were lower than that assumed in pricing:

Total	"Top 25"	Non-Traditional Guarantee
6	5	UL with premium no-lapse guarantee
4	4	UL with shadow fund
3	2	VUL no-lapse guarantee
2	2	UL ling-term care benefits
2	1	Survivorship life estate tax unwind
1	1	UL accelerated benefits
1	0	Survivorship life policy split option

The primary cause of the lower than anticipated profits were listed as (some companies checked more than one cause):

Cause	Number Responding
External market performance	6
Reserve changes	4
Administrative costs	3
Limitations of modeling at the time of pricing	2
Distributor actions	1
Policyowner actions	1

Also written in were competitive pressures, not hitting sales targets, cost increases as issue dates approach 2010 (for survivorship life).

Changes in benefits:

Regarding benefit revisions, 5 companies have ceased to offer certain benefits in the last two years, 3 of them are "top 25" companies. The benefits that were eliminated were UL premium guarantees, waiver of withdrawal cost if current charges increased or guarantees on survivorship UL. The reasons cited were reinsurance cost increases, reserve increases, capital usage, or lack of impact on sales.

In addition, 5 companies (4 "top 25") anticipate reducing the benefit or ceasing to offer certain benefits for new business in the next two years: 3 for no-lapse premium guarantee on UL, 1 for UL shadow fund, and the other company did not specify the benefit. Reasons cited are similar to above. They are lack of reinsurance, concern about potential reserve changes, non-competitiveness, or switching from UL premium guarantee to shadow fund.

Term:

Only one company out of 31 reported that its profits were lower than anticipated at the time of pricing, for a long-term premium guarantee. A couple of other companies did not report any specific products with lower profits, but checked off some of the reasons for lower profits. Reasons cited were external market performance, policyowner action, reinsurance, and distribution mix.

For the changes in benefits question, only one company has ceased to offer a guaranteed benefit in the last two years, which was a 5-year guarantee product, due to profitability concerns. Another company anticipates reducing the benefit or ceasing to offer certain benefits in the next two years for a cash value product.

Conclusion

Companies are continuing to expand the offerings of non-traditional guarantees, both because of their value to the consumer, their potential for building market share or market dominance and potential profits for the insuring company and distributors offering them. For most companies offering such guarantees, many of the factors outlined in this paper will need to be carefully evaluated. The increasing use and availability of hedging instruments and programs will greatly help the insurer's ability to have strong financial backing for these guarantees. However, hedging is not a sufficient solution in and of itself since other risks exist, such as regulatory, distribution, reserve, administrative, tax, and lapsation/exchange risks, – and also must be evaluated and controlled.

APPENDIX 1: Regulations

The following is a list of some of the more critical and difficult regulations for insurers offering products with non-traditional guarantees. This list is not comprehensive and is readily dated given ongoing changes.

The best source for current and comprehensive coverage of NAIC regulations is the American Academy of Actuaries work on NAIC proposals and regulations found at http://www.actuary.org/naic.htm. The SOA website (www.soa.org), the AAA website (www.actuary.org), and the NAIC website (www.naic.org) should be consulted for updated and comprehensive regulatory information, practice guidelines, and discussions of issues. Information on SEC pending issues and actions can be found at www.sec.gov.

RBC C-3 Phase II

RBC C-3 Phase II applies to variable annuities but not variable life insurance. Equity returns are based on a regime-switching log-normal model, with parameters based on historical performance. The distribution of returns has fat tails, which can be significant for variable annuity roll-up death benefits. Accumulated gains/losses from revenues and charges less benefits and expenses are projected, and the modified conditional tail expectation is used. A hedge strategy may be taken into account if the company is following a well-defined strategy.

Resources:

Regime-Switching Log Normal Model: www.soa.org/research/rsemw.html

www.actuary.org/pdf/life/c3_sept03.pdf
www.actuary.org/pdf/life/c3_june05.pdf
www.actuary.org/pdf/life/lcas_0305.pdf

"Recommended Approach for Setting Regulatory Risk-Based Capital Requirement for Variable Products with Guaranteed (Excluding Index Guarantees)"
www.actuary.org/pdf/life/rbc_16dec02.pdf

Rudolf, Max. "Current AAA Recommendation for RBC C-3 Phase II." The Financial Reporter. June 2003.

For VA CARVM guideline proposals consistent with RBC C-3 Phase II methodology see:
www.actuary.org/pdf/life/varwg_june05.pdf
www.actuary.org/pdf/life/varwg_0305.pdf

RBC Phase III

RBC Phase III will include stochastic testing for EIAs

Actuarial Guideline 33

Actuarial Guideline 33 covers VA GMDB reserves. The drop and recovery rates depend on the fund type, so reserves can change as policyowners switch funds.

Actuarial Guideline 34

Actuarial Guideline 34 covers variable annuity living benefits.

Resources:
www.actuary.org/pdf/life/variable_sept03.pdf
www.actuary.org/pdf/life/variable_june03.pdf
www.actuary.org/pdf/life/variable_030303.pdf
AAA Practice Note for the Application of Actuarial Guideline XXXIX (Dec 2002), www.actuary.org/pdf/practnotes/lifeVAGLB_dec02.pdf

Actuarial Guideline 37

Actuarial Guideline 37 covers VUL death benefit guarantees

Actuarial Guideline XXX

Actuarial Guideline XXX covers UL with secondary guarantees based on premiums.

Resources:
SOA Regulation Survey Report found at www.soa.org under Experience Studies (Finance)

Actuarial Guideline 38/AXXX

[This Guideline was tabled by the NAIC as of Dec. 2004 and is to be replaced by a modeling approach determining asset adequacy.]

Actuarial Guideline AXXX covers UL with secondary guarantees based on shadow accounts or catch-up features. The reserve depends on the policy funding level and can have a major impact on profitability. Differences in product designs can produce different reserves even if the product guarantees are fundamentally alike. Some companies have accused other companies of gaming reserves, either through use of two-tiered interest rates or by expense factors for shadow funds.

New York changed Regulation 147 in December 2004 for companies doing business in this state, strengthening reserves for UL products with secondary guarantees.

Actuarial Guideline 39

[This Guideline became effective 12/02 and has a sunset date of 1/1/06.
Actuarial Guideline 39 covers VA guaranteed living benefits.

Actuarial Guideline VL-GMDB

Actuarial Guideline VL-GMDB covers VUL secondary guarantees.

Actuarial Guideline VACARVM

Actuarial Guideline VACARVM covers reserves for variable annuity contracts.

FASB - FAS 60, 97, 133

The determination of what to apply requires determining whether it is an investment or insurance contract, whether it is a traditional or non-traditional contract, and whether there are embedded derivatives. FAS 60 covers traditional products. FAS 97 covers UL. FAS 133 covers EIAs and GMWB as a derivative.

Resources:
"Stochastic DAC Unlocking for Variable Annuity Products." Financial Reporter March 2001.

SFAS113

DIG Issue B 36, covering the implementation of FAS 113 to modified coinsurance and related arrangements:

Resources:
AAA practice note at http://www.actuary.org/pdf/practnotes/life_dig_05.pdf

Brown, Richard. "Embedded Derivatives in Modco and Similar Reinsurance Arrangements." The Financial Reporter. June 2003, Issue No. 53, p. 1

Lash, Steven, Rebecca Kao Wang, and Tara J.P. Hansen. "As the Dust Settles: Valuation Approaches for FAS 133 DIG Issue B36." The Financial Reporter. May 2004, Issue. No. 57, p. 12.

Wang, Rebecca Kao, and Tara J.P. Hansen. "FAS 133 Implementation Issue B36: Implications of the Financial Reporting of Reinsurance." The Financial Reporter, September 2003, Issue No. 54, p. 28.

AICPA

American Institute of Certified Public Accountants (AICPA) sets standard of practice for Generally Accepted Accounting Practices (GAAP).

Resources:
Fliegelman, Arthur. "Some Reserving is Better than None: Reserves for U.S. Life Insurers Under SOP 03-1"

Smith, Bradley and David Cook. "Implementation of SOP 03-1 for Lapse Protected Life Products." The Financial Reporter. May 2004, Issue No. 57. p. 6

Tsang, Vincent, and Heavilin, David. "Practical Considerations for Implementing the New Statement of Position for Long Duration Contracts and Separate Accounts"- Part 1 Financial Reporter, Nov 2003, Issue 55, pp. 1-11, Part II February 2004, Issue No. 56, p. 15, Part III May 2004, Issue No. 57, p. 26.

Market-value accounting

Market-value accounting is the eventual goal of the FASB. Some of the issues are:

1. How to calculate market liability?
2. How to treat the effects of volatility?
3. Fair value versus entity-specific value. Fair value is the amount that a third-party would require to take over the liability, and entity-specific is the value to the holding entity.

Resources:
North American Actuarial Journal, Vol. 6, No. 1, January 2002 has several articles on fair value accounting.

International Accounting Standards (IAS)

IAS applies to American subsidiaries of European companies and will be implemented in phases. All embedded derivatives must be held at fair value if they are not themselves insurance contracts.

IAS 32 - Financial Instruments: Disclosure and Presentation
IAS 39 - Financial Instruments: Recognition and Measurement
IFRS4 - Financial reporting of insurance contracts

Resources:

www.iasb.org/meetings/iash_decisionsummaries.asp

Freedman, Mark and Ludovic Antony. "Update on International Accounting Standards for Insurers". The Financial Reporter, August 2004, Issue 58, p. 15

Hay, Laura and Scott Wright. "Overview of IASB Accounting for Insurance Contracts." The Financial Reporter. March 2003, Issue No. 52, p. 6.

McLaughlin, S. Michael, Mark Friedman, and Ludovic Antony. "International Accounting Standards (IAS) on Top of Insurers' Minds." The Financial Reporter. February 2004, Issue No. 56, p. 1

Stern, Larry and Sam Gutterman. Emerging Issues Advisory Group Issue Paper on Fair Value Liabilities. The Actuary, December 2004, p. 31-34

APPENDIX 2: Company Responses to Survey of Non-Traditional Guarantees

A. Survey participants

Participation in the survey was voluntary. The survey was distributed to the major companies selling products with non-traditional guarantees, and to the members of the Product Development section for distribution at their companies. The survey was divided into three parts: Annuities, Variable and Universal Life, and Term. Most companies submitted responses to all three parts, but a few companies sent responses to only one or two parts or did not sell relevant products for some parts.

33 companies sent responses to all or part of the survey. The participants were AEGON, American Express, Ameritas, AXA, Empire General, Farm Bureau, Foresters, Genworth, Guardian, Hartford, Humana, ING, Integrity, Jackson National, Liberty Life, Lincoln, Manulife, Mennonite Mutual, Minnesota Life, Modern Woodmen, Mutual of Omaha, Nationwide, New York Life, Northwestern Mutual, Pacific Life, Penn Mutual, Prudential, Samsung, Security Benefit, State Farm, Thrivent, TIAA CREF, and Union Central.

29 companies sent responses to the Annuity section

Responding companies are classified as "top 25" if they were in the top 25 sellers of variable annuities during the 2003-2004 period.
15 companies are classified as "top 25"
14 companies are not "top 25"

The responding companies represent approximately 64 percent of industry sales of variable annuities during the 2003-2004 period (based on VARDS data as reported in The National Underwriter, 2003-2004).

31 companies sent responses to the Universal Life and Variable Universal Life section

Responding companies are classified as "top 25" if they were in the top 25 sellers of variable universal life during the 2003-2004 period.
16 companies are classified as "top 25"
15 companies are not "top 25"

The responding companies represent approximately 73 percent of industry sales of variable universal life during the 2003-2004 period (based on VARDS data as reported in The National Underwriter, 2003-2004).

31 companies sent responses to the Term section

For some questions, separate results are presented for all companies and for companies classified as “top 25” where the responses are significantly different.

Some participants omitted answers to a few questions, and some questions permitted multiple responses. Therefore, the number of responses to each question varies.

B. Results for annuities

1. Benefit guarantees

a. Variable annuities

The number of survey companies offering these benefits, from most to least common benefits, are:

Total	“Top 25”	
26	15 (100%)	GMDB (guaranteed minimum death benefits)
18	12	EEB (enhanced earnings benefit)
14	10	enhanced DCA (dollar-cost-averaging) rates
14	10	GMAB (guaranteed minimum accumulation benefits)
14	10	spousal step-up benefits on death
11	10	GMWB (guaranteed minimum withdrawal benefits)
9	6	GMIB (guaranteed minimum income benefits)
5	4	principal protection plans (guarantees that the value of the contract, under certain conditions of investment, is not less than the invested amount)
4	3	GPAF (guaranteed payout annuity floor, guaranteeing a floor on subsequent annuity payments in relation to the first payment)

b. Equity-indexed annuities

4 companies offer EIAs with annual ratchet

2 companies offer EIAs with multi-year point-to-point

c. Other annuity benefits

17 companies offer commutation payouts or withdrawals on income annuities
4 companies offer long-term care benefits on annuities
3 companies offer underwritten income annuities
3 companies offer payout guarantees on deferred annuities (other than nominal guarantees)

2. Competitive importance of offering the guarantees

Companies were asked to indicate how important the non-traditional guarantees have been to achieving their marketing goals, based on the following 1-5 scale:

1: mandatory to sell in our market
2: increases sales significantly
3: increases sales somewhat
4: not as important as other product or compensation factors
5: unimportant

For the "top 25" companies, benefits in approximate order from most to least important are:

mainly "1's": GMDB
"1's" and "2's": GMWB
mainly "2's" and "3's": GMIB
mainly "3's": GMAB
mainly "3's" through "5's": GPAF, EEB, principal protection plans, enhanced dollar cost averaging rates, spousal step-up on death, and commutation payments or withdrawals on income annuities. However, one company rated EEB as a "1", one company rated spousal step-up on death as a "1", and three companies rated enhanced DCA rates as a "1"
mainly "5's": equity-indexed annuities, underwritten annuities, payout guarantees on annuities (other than nominal guarantees)

For the companies not in the "top 25"

mainly "1's": GMDB's
mainly "3's" through "5's": GMWB, GMIB, GMAB, GPAF, enhanced DCA rates, spousal step-up on death, commutation payouts or withdrawals on income annuities, underwritten annuities

split between “1’s” and “4’s”: EEB
mainly “5’s”: principal protection plans, payout guarantees on annuities (other than nominal guarantees)
only 2 companies in this group offered an equity-indexed annuity, and rated it as “1” or “2”

3. Reserving the right to change the benefits

12 companies reserve the right to change the price or terms of some of their guarantees for inforce business:

5 reserve the right to change price or features of the GMAB
2 reserve the right to change price or features of the GMDB
other companies reserve the right to change the price or features of the spousal step-up, commutation benefits, or enhanced DCA

Out of the 12 companies that have reserved the right to change some feature of their guaranteed benefits, only one company has ever exercised this right, on the GMAB.

17 companies do not reserve the right to change any benefits

4. Recent changes in benefits

6 companies have ceased to offer certain benefits in the last two years.

4 companies ceased to offer versions of the GMDB which were rollups or had dollar-for-dollar partial withdrawals
2 companies ceased to offer GMIBs

Many reasons were cited for the decision to cease offering these benefits: loss or lack of reinsurance coverage, lack of hedging instruments, increased cost concerns, high utilization, low sales, equity risk, unacceptable tail scenario risk, high capital requirements, and market conduct concerns.

5. Anticipated future changes in benefits

Very few companies anticipate reducing the benefit or ceasing to offer certain benefits for new business in the next two years:

1 company anticipates eliminating the GPAF
1 company anticipates eliminating the EEB
1 company anticipates eliminating a GMDB that is the larger of a ratchet and a rollup

Reasons cited are: too much volatility until a hedge program is in place, unacceptable tail scenario risk, and low sales

6. Conversion programs

Conversion programs for existing clients, either into or out of a product with non-traditional guarantees, were uncommon. 5 companies had some sort of conversion program; 4 of these companies rated the conversion program as having little effect, and 1 rated it as being moderately successful.

7. Creating products that serve as hedges to each other

3 out of the 29 companies responded that they had created benefit guarantees with the purpose of serving as hedged to other guarantees. The benefits cited were EEB and GMDB,

8. Limits on new business

2 of the "top 25" companies set some limits on new business with certain of these guarantees, based on size of contribution or annual new premium. 4 of the non-"top 25" companies set limits, based on amount of premium within a given period of time, or total amount of premium.

9. Patents

4 of the "top 25" companies have or are considering getting patents on any of these non-traditional guarantees or related features

None of the "non-top 25" companies are considering getting patents

10. Private-letter rulings

Only one company reports seeking a private-letter ruling, concerning the tax status of payments out of an income annuity.

11. Effect of offering non-traditional guarantees on ratings

None of the companies indicate that they believe that their ratings have been negatively affected by offering non-traditional guarantees.

12. Administration

Most of the companies administer their business internally. Only 2 companies use third-party administration. Neither of these companies say that they have had problems with the third-party administration of the non-traditional guaranteed benefits.

13. Future concerns

Companies were asked to check any of the following which they believe has a significant probability (more than 50 percent chance) of occurring over the next few years and decreasing their expected profits on products with non-traditional guarantees:

14 cited reserve changes
5 cited litigation risks
4 cited tax law changes
3 cited changes in 1035 activity due to partial 1035s
3 cited changes in lapsation due to increasing annuity settlement activity (purchase of policies by a third-party)

14. Lower than anticipated profits

The following numbers of companies responded that their profits were lower than anticipated at the time of pricing:

Total	"Top 25"	
14	9	GMDB
3	3	equity-indexed annuities
2	1	GPAF
1	1	GMIB
1	1	EEB
1	1	enhanced dollar-cost-averaging rates

The primary cause of lower than anticipated profits was listed as (some companies checked more than one cause):
12 companies - external market performance
5 companies - reserve changes
3 companies - administrative costs
3 companies - limitations of modeling at the time of pricing

15. Profit and risk measures

a. Profit measures

Many companies specified multiple profit measures. The most common measure was the present value of profits, and the next most common was IRR. Other common measures were ROI or GAAP ROE. A number of other profit measures were written in: ROA, GAAP profit margin, PV of contribution to cover fixed expenses and overhead, statutory book profit, average statutory return on assets, statutory ROA, analysis of percentiles, hedging costs, and present value of profits as a percentage of present value of premium.

b. Risk measures

Required capital and stress tests were both used as risk measures by most companies. A few companies also measure value at risk or embedded value at risk. Other measures written in are: CTE of book profits, statutory gain/loss in tail scenarios, stochastic minimum threshold, and average of worst 5 percent of present value of profits.

c. Incorporating risk into pricing

Most companies incorporate risk into pricing by either adding margins to the assumptions or setting higher capital allocations. Several companies set higher profit targets to reflect the risk. Other methods were also written in: cost of hedging, adding margin to the hedging cost, cost of reinsurance, including the cost of risk management, price set to cover 85th percentile loss, entering the additional cost into a deterministic pricing model, or stochastic modeling.

16. Stochastic modeling

Some respondents checked multiple answers in this section, so these answers are not additive. 25 out of 29 annuity respondents provided information on their stochastic modeling.

a. Source of stochastic models

19 companies use stochastic models developed internally
10 use commercial models
6 use consultants

No significant difference in answers for “top 25” or “non-top 25” companies

b. For producing equity growth rates

18 companies use log-normal methods
7 companies use regime switching
6 companies use mean reversion
no companies report using non-normal methods

No significant difference in answers for "top 25" or "non-top 25" companies

c. Source of equity and/or interest scenarios

17 companies use internally-generated scenarios
8 use commercial vendors
3 use consultants
2 use AAA scenarios

No significant difference in answers for "top 25" or "non-top 25" companies

d. Number of scenario sets

There was some difference in the responses of "top 25" and "non-top 25" companies.

"Top 25" companies generally used more than 5 scenario sets representing different subaccounts; "non-top 25" companies used 5 or less.

"Top 25" companies typically used 1,000 scenarios in each scenario set, with one company using up to 10,000 scenarios. "Non-Top 25" companies were equally divided between those who used 100 scenarios and those who used 1,000 scenarios.

e. Index validation

Validation method:
The most common validation method was historic parameter matching, cited by 13 companies. 6 companies match on historical results, and 4 companies match major historical patterns such as market crashes or periods of high or low returns. Some of the "top 25" companies listed other validation methods: dividend discount theory, calibration to capital market assumptions, C-3 Phase II calibration, volatility closer to implied value than historical value.

Validation period:
"Non-Top 25" companies listed validation periods between 15 and 30 years. "Top 25" companies typically listed validation periods since 1926 or based on all available history.

f. Scenario reduction techniques

Most companies did not supply a response to this question. Of the companies responding, 6 companies use stratified samples intended to replicate the overall scenario. 2 companies use the best, mean, or worst subsets (i.e. worst 5 percent, 10 percent).
Other companies wrote in that they used: Langley-Cook, subset that replicates critical values, or using 100 stratified samples plus 2 scenarios that produce minimum and maximum results.

g. Dynamic variation of assumptions

Assumptions which vary dynamically within the model:

21 companies - lapse rates
13 companies - withdrawal rates
8 companies - annuitization rates
3 companies - fund allocations
1 company - premium deposits

Also written in were expense/average size inflation, and crediting rates/reserves

h. Modeling of lapses under adverse conditions

19 companies model lapses under adverse economic or market changes
4 companies model lapses under adverse distribution channel risks

i. Evaluating output of the stochastic model:

Most companies checked more than one type of evaluation

20 companies use percentile distributions
19 companies use analysis of worst scenarios
15 companies use conditional tail expectations
14 companies use mean or variance analyses
4 companies use modified conditional tail expectations
4 companies use earnings at risk
2 companies use value at risk

17. Sources for assumptions

Almost all companies report that their source for withdrawal rates, lapse rates, premium deposits, fund allocations, and annuitization rates is from internal experience. About two-thirds of the respondents use actuarial judgment in addition to internal experience for withdrawal rates, lapse rates, and annuitization rates, and about one-half of the companies use actuarial judgment in addition to internal experience for premium deposits and fund allocations.

Very few companies use external data in setting assumptions: three companies report using some external data for lapse assumptions, one for premium deposits, and one for annuitization rates.

No companies report using assumptions set by corporate parameters.

18. Reinsurance

"Top 25 companies"

5 use reinsurance as a significant part of their risk management program for non-traditional guarantees
6 do not
4 left this question unanswered

"Non-top 25" companies

2 use reinsurance
11 do not
1 left this question unanswered

19. Hedging

a. Use of hedging

"Top 25 companies"

9 hedge equity-related risks
4 do not
2 left this question unanswered

"Non-top 25" companies

3 hedge equity-related risks
11 do not

b. Primary reason for hedging

8 companies - reduce volatility of results
6 companies - cap losses
2 companies - minimize capital and reserve requirements
2 companies - improve ratings

c. Primary reasons for not hedging

4 companies - cost
5 companies - lack of time or expertise to run a hedging program
2 "top 25" companies and 7 "non-top 25" companies: too small a block of business to hedge

d. Source of hedging program

8 companies use internal resources
2 companies use commercial software
2 companies use consultants or other third-party resources

e. Hedging measures used

11 companies use delta
6 companies use rho
5 companies use vega
4 companies use gamma

f. Separate profit center

Only one company reports running hedging as a separate profit center within the company.

20. Securitizations, swaps, or structured liabilities related to the benefit guarantees

3 companies report using such transactions
12 do not
14 companies left this question unanswered

21. Off-shore solutions used as part of the management of the non-traditional guarantees

"Top 25" companies:
- 5 use off-shore solutions
  - 5 use reinsurance, 1 also uses financial reinsurance
- 8 do not use off-shore solutions
- 2 companies left this question unanswered

"Non-top 25" companies:
- 2 use off-shore solutions, both for reinsurance
- 12 do not use off-shore solutions
- 1 company left this question unanswered

C. Results for Universal Life and Variable Universal Life

1. Benefit guarantees

The number of companies reporting each type of guarantee, from most to least common:

Total no.	"Top 25"	
21	16 (100%)	VUL with no-lapse guarantee 12 companies have lifetime or to age 100 guarantees (10 of these companies are "top 25") 1 company has 30 year guarantee 3 companies have 20 year guarantees 1 company has guarantee to age 85, 1 to age 75, 1 to age 70 other guarantees are for various shorter periods
20	12	UL with premium no-lapse guarantee 14 companies have lifetime or to age 100 guarantees (9 of these companies are "top 25") 1 company has 30 year guarantee other company guarantees are for various shorter periods 16 companies have a catch-up feature (10 of these are "top 25" companies)
19	14	Policy split option on survivorship life

19	13	Accelerated benefits on UL or VUL
12	10	UL with shadow fund
9	7	Estate tax unwind on survivorship life
3	3	Long-term care benefits on UL or VUL
1	0	Bonus or refund triggered if current charges are increased

2. Competitive importance of offering the guarantees

Companies were asked to indicate how important the non-traditional guarantees have been to achieving their marketing goals, based on the following 1-5 scale:

1: mandatory to sell in our market
2: increases sales significantly
3: increases sales somewhat
4: not as important as other product or compensation factors
5: unimportant

For the "top 25" companies, benefits in approximate order from most to least important are:

mainly "1's", a few "2's": UL with no-lapse guarantee based on shadow fund
mainly "1's", with some "2's" through "4's": UL with premium no-lapse guarantee
"1's" through "5's", average "3": VUL with no-lapse guarantee
"1's" through "5's", average "4": Survivorship life with estate tax unwind or policy split option
few responses for UL or VUL with long-term care benefits, or bonuses or refunds if current charges increase

For the companies not in the "top 25"

divided between "1's" and "3's": UL with premium no-lapse guarantee
"1" and "2" (only 2 respondents): UL with shadow fund
mainly "3's": VUL with no-lapse guarantee
"3's" through "5's": accelerated benefits on UL or VUL, bonuses or refunds triggered if current charges increase, survivorship life with estate tax unwind or policy split option

3. Reserving the right to change the benefits

Only 2 companies reserve the right to change the price or terms of some of their guarantees for inforce business, for UL premium or shadow fund guarantees. Neither of these companies has exercised this right.

4. Recent changes in benefits

5 companies have ceased to offer certain benefits in the last two years, 3 of them "top 25" companies.
The benefits that were eliminated were UL premium guarantees, waiver of withdrawal cost if current charges increased, or guarantees on survivorship UL.
The reasons cited were reinsurance cost increases, reserve increases, capital usage, or lack of impact on sales.

5. Anticipated future changes in benefits

4 "top 25" and 1 "non-top 25" companies anticipate reducing the benefit or ceasing to offer certain benefits for new business in the next two years: 3 for no-lapse premium guarantee on UL, 1 for UL shadow fund, 1 unspecified.

Reasons cited are lack of reinsurance, concern about potential reserve changes, non-competitiveness, or switching from UL premium guarantee to shadow fund.

6. Conversion programs

Conversion programs for existing clients, either into or out of a product with non-traditional guarantees, were uncommon. 5 companies had some sort of conversion program; 4 of these companies rated the conversion program as having little effect, and 1 rated it as being moderately successful.

7. Limits on new business

6 of the "top 25" companies and 1 of the "non-top 25" companies set some limits on new business with certain of these guarantees, based on face amount, percentage of life sales, or surplus strain.

8. Patents

2 of the "top 25" companies have or are considering getting patents on any of these non-traditional guarantees or related features
None of the "non-top 25" companies are considering getting patents

9. Private-letter rulings

No company reports seeking a private-letter ruling.

10. Effect of offering non-traditional guarantees on ratings

None of the companies indicate that they believe that their ratings have been negatively affected by offering non-traditional guarantees.

11. Administration

All of the companies administer their business internally; none use third-party administration.

12. Future concerns

Companies were asked to check any of the following which they believe has a significant probability (more than 50 percent chance) of occurring over the next few years and decreasing their expected profits on products with non-traditional guarantees:

14 cite reserve changes
8 cite changes in lapsation due to increasing life settlement activity (purchase of policies by a third party)
3 cite litigation risks
1 cites tax law changes
Also written in are: continued low interest rates, increased capital requirements, increases in costs of letters of credit, and increase in reinsurance rates

13. Lower than anticipated profits

The following numbers of companies responded that their profits were lower than anticipated at the time of pricing:

Total	"Top 25"	
6	5	UL with premium no-lapse guarantee
4	4	UL with shadow fund
3	2	VUL no-lapse guarantee
2	2	UL long-term care benefits
2	1	survivorship life estate tax unwind
1	1	UL accelerated benefits
1	0	survivorship life policy split option

The primary cause was listed as (some companies checked more than one cause):

6 companies - external market performance
4 companies - reserve changes
3 companies - administrative cost of the guaranteed feature
2 companies - limitations of modeling at time of pricing
1 company - distributor actions
1 company - policyowner action

Also written in were: competitive pressures, not hitting sales targets, cost increases as issue dates get closer to 2010 (for survivorship life)

14. Profit and risk measures

a. Profit measures

Many companies specified multiple profit measures. The most common measure was IRR, followed closely by PV of profits. Other common measures were GAAP ROE and ROI. Other measures written in were: annual GAAP income, GAAP margin, present value contribution to fixed expense and overhead, profit per thousand per year, present value of profit as a percentage of present value of premium, profit margin, breakeven year, embedded values, IRR using economic reserves, present value of distributable earnings, value added, and return on assets.

b. Risk measures

Required capital and stress tests were both used as risk measures by most companies. A few companies also measure value at risk or embedded value at risk. Several respondents wrote in stochastic testing, stochastic projection, or stochastic testing of interest rate risk.

c. Incorporating risk into pricing

Most companies incorporated risk into pricing by either adding margins to the assumptions or setting higher capital allocations. Several companies set higher profit targets to reflect the risk. Other methods were also written in: reserve strengthening based on stochastic analysis, additional reserves, entering additional cost into deterministic pricing model, or stochastic testing.

15. Modeling

a. Dynamic variation of assumptions

Assumptions which vary dynamically within the model:

13 companies - lapse rates
3 companies - premium deposits
2 companies - withdrawal rates
2 companies - fund allocation
Also written in were interest rates

b. Modeling of lapses under adverse conditions

13 companies model lapses under adverse economic or market changes
3 companies model lapses under adverse distribution channel risks
1 company models lapses under adverse regulatory or tax changes

c. Sources for assumptions

Almost all companies report that their source for withdrawal rates, lapse rates, premium deposits, and fund allocations is from internal experience. About two-thirds of the respondents use actuarial judgment in addition to internal experience for withdrawal rates and lapse rates, and about one-half of the companies use actuarial judgment in addition to internal experience for premium deposits and fund allocations.

Very few companies use external data in setting assumptions: four companies report using some external data for lapse assumptions, one for premium deposits, and one for withdrawal rates.

One company reports using assumptions set by corporate parameters for lapse rates and fund allocations.

16. Reinsurance

"Top 25 companies"
- 11 use reinsurance as a significant part of their risk management program for non-traditional guarantees
- 5 do not

"Non-top 25" companies
- 2 use reinsurance
- 9 do not
- 4 companies did not reply to this question

17. Hedging

No companies report using hedging.

Primary reasons for not hedging:
- 15 companies - too small a block of business to hedge
- 6 companies - lack of time or expertise to run a hedging program
- 4 companies - cost
- 2 companies - lack of availability of appropriate hedges

18. Securitizations, swaps, or structured liabilities related to the benefit guarantees

No companies report using such transactions

19. Off-shore solutions used as part of the management of the non-traditional guarantees

"Top 25" companies:
- 7 use off-shore solutions
  - 5 use reinsurance, 6 use financial reinsurance
- 9 do not use off-shore solutions

"Non-top 25" companies:
- No companies report using off-shore solutions

D. Results for term insurance

1. Benefit guarantees

The number of companies reporting each type of benefit guarantee are:

19 companies - long-term premium guarantee
- 11 companies - 30 year guarantee
- 6 companies - 20 year guarantee
- 1 company - 10 year guarantee
- 1 unspecified

18 companies - favorable conversion provisions to other life products

2 companies - cash values

1 company - guaranteed full return of premium

1 company - guaranteed partial return of premium

1 company - guarantees tied to external index or event

2. Competitive importance of offering the guarantees

Companies were asked to indicate how important the non-traditional guarantees have been to achieving their marketing goals, based on the following 1-5 scale:

1: mandatory to sell in our market
2: increases sales significantly
3: increases sales somewhat
4: not as important as other product or compensation factors
5: unimportant

Mainly "1's", a few "2's": long-term premium guarantee

"1's" through "5's", average "3": favorable conversion provisions to other life products

Most companies did not have other benefits. One company rated cash values a "1", and one company rated guaranteed return of full premium a "1".

3. Reserving the right to change the benefits

Only one company reserves the right to change the price or terms of some of their guarantees for inforce business, for a premium with indeterminate plan. This right has not been exercised.

4. Recent changes in benefits

Only one company has ceased to offer a guaranteed benefit in the last two years, which was a 5-year guarantee product, due to profitability concerns.

5. Anticipated future changes in benefits

Only one company anticipates reducing the benefit or ceasing to offer certain benefits for new business in the next two years, for a cash value product.

6. Conversion programs

Only one company reports a conversion program, updating existing clients into a product with non-traditional guarantees, rating this program "moderately successful."

7. Limits on new business

2 companies set some limits on new business with certain of these guarantees, based on face amount.

8. Patents

No companies have or are considering getting patents on any of these non-traditional guarantees or related features.

9. Private-letter rulings

No company reports seeking a private-letter ruling.

10. Effect of offering non-traditional guarantees on ratings

None of the companies indicate that they believe that their ratings have been negatively affected by offering non-traditional guarantees.

11. Administration

Only 2 companies use third-party administration, and neither of them report problems with the administration of the guarantees.

12. Future concerns

Companies were asked to check any of the following which they believe has a significant probability (more than 50 percent chance) of occurring over the next few years and decreasing their expected profits on products with non-traditional guarantees:

3 cite reserve changes
2 cite changes in lapsation due to increasing life settlement activity (purchase of policies by a third party)
2 cite tax law changes
1 cites litigation risks

Also written in are: continued low interest rates, mortality fluctuation, reinsurance rates.

13. Lower than anticipated profits

Only one company reported that its profits were lower than anticipated at the time of pricing, for a long-term premium guarantee. A couple of other companies did not report any specific products with lower profits, but checked off some of the reasons for lower profits. Reasons cited were external market performance, policyowner action, reinsurance, and distribution mix.

14. Profit and risk measures

a. Profit measures

Many companies specified multiple profit measures. The most common measures were IRR and PV of profits. Other common measures were GAAP ROE and ROI. Other measures written in were: profit margin, breakeven year (cited by 3 companies), embedded value, percentage of

premium risk measures, present value contribution to fixed expenses and overhead, profit per thousand per year, present value of profits as a percentage of premium.

b. Risk measures

Required capital and stress tests were both used as risk measures by most companies. Three companies also measure value at risk or embedded value at risk. One respondent wrote in shifts in distribution between more and less profitable cells.

c. Incorporating risk into pricing

Companies were fairly evenly divided between adding margins to the assumptions, setting higher capital allocations, or setting higher profit targets to reflect the risk. Other methods were also written in: stress tests, conversion anti-selection costs built into the term premium, sensitivity studies on lapse rates and interest rates, entering additional cost into deterministic pricing model.

15. Modeling

a. Stochastic simulation of mortality

5 companies report using stochastic simulations of mortality
21 companies do not
5 companies did not answer this question

b. Modeling of lapses under adverse conditions

3 companies model lapses under adverse economic or market changes
2 companies model lapses under adverse distribution channel risks

16. Reinsurance

19 use reinsurance as a significant part of their risk management program for non-traditional guarantees
5 do not
7 companies did not answer this question

17. Off-shore solutions used as part of the management of the non-traditional guarantees

7 use off-shore solutions
5 use reinsurance, 4 use financial reinsurance

17 do not use off-shore solutions
7 companies did not answer this question

E. Corporate Risk Management

28 companies do corporate-wide enterprise risk management

13 companies have the Chief Financial Officer in charge of the risk management
11 companies use a Corporate Risk Manager
1 company uses the Chief Actuary
1 company uses the CEO
1 company uses an Executive VP
1 company uses a committee of top executives

5 companies do not do corporate-wide enterprise risk management

APPENDIX 3: Survey of Non-traditional Guarantees

Company: _____

Contact: _____

SECTION 1: ANNUITIES

1. Benefit guarantees

   a. What non-traditional guarantees on annuities do you offer or plan to offer?

      Variable annuities:

      ____ with GMDB (guaranteed minimum death benefits)
      ____ with GMWB (guaranteed minimum withdrawal benefits)
      ____ with GMAB (guaranteed minimum accumulation benefits)
      ____ with GMIB (guaranteed minimum income benefits)
      ____ with GPAF (guaranteed payout annuity floor, guaranteeing a floor on subsequent annuity payments in relation to the first payment)
      ____ with EEB (enhanced earnings benefit)
      ____ principal protection plans (guarantees that the value of the contract, under certain conditions of investment, is not less than the invested amount)
      ____ enhanced dollar-cost-averaging rates
      ____ spousal step-up benefits on death
      ____ other guarantees on VA's. Specify: _____

      ____ Equity-indexed annuities
      Type of guarantee:
      _____ annual ratchet
      _____ high water
      _____ multi-year point-to-point
      _____ all or nothing
      _____ other

      ____ Commutation payouts or withdrawals on income annuities

      ____ Underwritten income annuities

      ____ Long-term care benefits on annuities

____ Payout guarantees on deferred annuities (other than nominal guarantees)

Other annuity guarantees: _____

b. Do you have the right to change the price or terms of any of these guarantees for inforce business?

_____ yes
_____ no

If yes, which ones can be changed? _____
Have you ever exercised this right?

_____ yes
which ones? _____
what was the reason? _____

_____ no

c. Do you expect to significantly reduce the benefit or stop offering any of these guarantees for new business in the next two years?

_____ yes
_____ no

If yes, which benefits do you expect to reduce or stop offering?

_____

Why?

_____

d. Have you ceased to offer any of these benefits within the last two years?

_____ yes
_____ no

If yes, which benefits did you reduce or stop offering?

_____

What was your reason for this change?

_____

e. Have you had conversion programs that updated existing clients into a product with any of these non-traditional guarantees?

_____ yes
_____ no

Would you rate these conversion programs as:
_____ highly successful
_____ moderately successful
_____ had little effect

f. Have you had conversion programs that switched existing clients out of a product with any of these non-traditional guarantees?

_____ yes
_____ no

Would you rate these conversion programs as:
_____ highly successful
_____ moderately successful
_____ had little effect

g. Have you created any benefit guarantees with the purpose of serving as hedges to other guarantees you offer?

_____ yes
Please describe the offsetting hedges: _____
_____ no

2. Please indicate how important any of these non-traditional guarantees have been to achieving your marketing goals, based on the following 1-5 scale:
1: mandatory to sell in our market
2: increases sales significantly
3: increases sales somewhat
4: not as important as other product or compensation factors
5: unimportant

Variable annuities:
____ with GMDB
____ with GMWB
____ with GMAB
____ with GMIB

____ with GPAF
____ with EEB
____ principal protection plans
____ enhanced dollar-cost-averaging rates
____ spousal step-up benefits on death
____ other guarantees on VA's. Specify: _____

____ Equity-indexed annuities

____ Commutation payouts or withdrawals on income annuities

____ Underwritten income annuities

____ Long-term care benefits on annuities

____ Payout guarantees on deferred annuities (other than nominal guarantees)

Other annuity guarantees: _____

3. Do you set any limits on new business for products with these non-traditional guarantees?
   _____ yes
   What are the limits based on: _____
   _____ no

4. Do you have, or are considering getting, patents on any of these non-traditional guarantees or related features?
   _____ yes
   _____ no

5. Do you use third-party administration for any of these products?
   _____ yes
   _____ no

   If so, have you had significant problems specifically related to the administration of these non-traditional guarantees?
   _____ yes
   _____ no

6. Have you sought any private-letter rulings concerning these non-traditional guarantees?
   _____ yes. Add specifics: _____
   _____ no

7. Do you believe that any of your company ratings have been negatively affected by offering these non-traditional guarantees?
   _____ yes
   _____ no

8. Please check any of the following which you believe has a significant probability (more than 50% chance) of occurring over the next few years and decreasing your expected profits on products with non-traditional guarantees?

   _____ changes in 1035 activity due to partial 1035's
   _____ changes in lapsation due to increasing annuity settlement activity (purchase of policies by a third-party)
   _____ reserve changes
   _____ tax law changes
   _____ litigation risks
   _____ other. Specify: _____

9. For which of the following benefits have your profits been lower than anticipated at the time of pricing:

   Variable annuities:
   ____ with GMDB
   ____ with GMWB
   ____ with GMAB
   ____ with GMIB
   ____ with GPAF
   ____ with EEB
   ____ principal protection plans
   ____ enhanced dollar-cost-averaging rates
   ____ spousal step-up benefits on death
   ____ other guarantees on VA's. Specify: _____

   ____ Equity-indexed annuities

   ____ Commutation payouts or withdrawals on income annuities

   ____ Underwritten income annuities

____ Long-term care benefits on annuities

____ Payout guarantees on deferred annuities (other than nominal guarantees)

Other annuity guarantees: _____

What has been the primary cause of profits not meeting pricing expectations?

_____ external market performance
_____ policyowner actions
_____ reserve changes
_____ distributor actions
_____ limitations of modeling at the time of pricing
_____ administrative costs of the guarantee features
_____ other: please explain _____

10. Pricing and risk assessment

a. What measures do you use in determining the price and assessing the risks of non-traditional guarantees?

Profit:

____ GAAP ROE
____ other GAAP target. Specify: _____
____ IRR
____ ROI or other return on capital/investment
____ PV of profits
____ other measures. Specify: _____

Risk Measures:

____ required capital
____ value at risk
____ embedded value at risk
____ stress tests
____ other. Specify: _____

b. Are the risks for these non-traditional guarantees incorporated into the pricing process by:

_____ using higher profit targets to reflect the risk
_____ adding margins to the assumptions
_____ setting higher capital allocations
_____ other. Specify: _____

c. If you do stochastic modeling:

Do you use:

_____ models developed internally?
_____ commercial models?
_____ consultants?

Check all which apply for producing equity growth rates:

_____ log-normal methods
_____ non-normal methods
_____ regime-switching
_____ mean-reversion

What is the source of your equity and/or interest scenarios:

____ AAA
____ commercial vendors
____ internally-generated
____ other. Specify: _____

How many scenario sets do you have that represent different subaccounts? _____

How many scenarios are typically in each set? _____

Validation:

What are your criteria for index validation?

_____ historical parameter matching
_____ matching historical results
_____ matching major historical patterns such as market crashes, periods of low, high, returns, etc
_____ other. Specify: _____

What is your typical validation period? _____

What scenario reduction techniques do you use:

_____ stratified samples intended to replicate the overall scenario set with higher variance but shorter run times
_____ best, mean, worst subsets (i.e. worst 5%, 10%)
_____ other techniques. Specify: _____

In evaluating the output of the model, check all you use:

_____ conditional tail expectations
_____ modified conditional tail expectations
_____ mean or variance analyses
_____ analysis of worst scenarios
_____ earnings at risk
_____ value at risk
_____ percentile distribution
_____ other. Specify: _____

d. Please check the source of your assumptions for the following policyowner actions:

	Withdrawal rates	Lapse rates	Premium deposits	Fund allocations	Annuitization rates
Internal experience					
External data					
Actuarial judgment					
Assumptions set by corporate parameters					

e. Which of your assumptions vary dynamically within the model?

_____ withdrawal rates
_____ lapse rates
_____ premium deposits
_____ fund allocation
_____ annuitization rates
_____ other. Specify: _____

f. Do you model lapses under any of the following adverse conditions:
_____ economic or market changes
_____ distribution channel risks
_____ regulatory or tax changes
_____ changes due to corporate credit rating changes
_____ other. Specify: _____

11. Reinsurance

Do you have reinsurance as a significant part of your risk management program for these non-traditional guarantees?

_____ yes
_____ no

12. Hedging

Do you hedge equity-related risks for these non-traditional guarantees?

_____ yes

If so, what is the primary reason for hedging:
_____ reduce volatility of results
_____ cap losses
_____ minimize reserve and surplus requirements
_____ improve ratings
_____ other. Specify: _____

_____ no

If not, what is the reason?
____ cost
____ lack of availability of appropriate hedges
____ lack of time or expertise to run a hedging program
____ too small a block of business to hedge
____ other. Specify: _____

Do you run your hedging program using:
____ internal resources
____ internal resources using commercial software
____ consultants or other third-party resources to run the program

Which measures do you match for hedging?

____ Delta
____ Gamma
____ Rho
____ Vega
____ other. Specify: _____

Is the hedging area run as a separate profit center within the company?

_____ yes
_____ no

Do you enter into any transactions such as securitizations, swaps, or structured liabilities related to the benefit guarantees?

_____ yes
_____ no

13. Corporate risk management

Does your company do corporate-wide enterprise risk management?

_____ yes
_____ no

Who is in charge of the corporate-wide enterprise risk management:

_____ Chief Risk Officer
_____ Chief Actuary
_____ Chief Financial Officer
_____ other. Specify: _____

14. Do you use any off-shore solutions which are part of your management of the non-traditional guarantees?

_____ yes
_____ reinsurance
_____ financial reinsurance
_____ investment management
_____ private placements
_____ other. Specify: _____
_____ no

SECTION 2: UNIVERSAL LIFE AND VARIABLE UNIVERSAL LIFE

1. Benefit guarantees

   a. What non-traditional guarantees on universal life and variable universal life do you offer or plan to offer?

      UL

      ___ with premium no-lapse guarantee
      Maximum period of premium guarantee: _____
      Is there a catch-up feature?: _____

      ___ with no-lapse guarantee based on shadow fund

      VUL
      ___ with no-lapse guarantee
      Maximum period of guarantee: _____

      UL or VUL
      _____ Accelerated benefits
      _____ Long-term care benefits
      _____ Bonus or refund triggered if current charges are increased

      Survivorship life
      _____ with estate tax unwind
      _____ with policy split option

      Other UL or VUL guarantees:_____

   b. Do you have the right to change the price or terms of any of these guarantees for inforce business?
      _____ yes
      _____ no
      If yes, which ones can be changed? _____
      Have you ever exercised this right?
      _____ yes
      which ones? _____
      what was the reason? _____
      _____ no

c. Do you expect to significantly reduce the benefit or stop offering any of these guarantees for new business in the next two years?

_____ yes
_____ no

If yes, which benefits do you expect to reduce or stop offering?

_____

Why?

_____

d. Have you ceased to offer any of these benefits within the last two years?

_____ yes
_____ no

If yes, which benefits did you reduce or stop offering?

_____

What was your reason for this change?

_____

e. Have you had conversion programs that updated existing clients into a product with any of these non-traditional guarantees?

_____ yes
_____ no

Would you rate these conversion programs as:

_____ highly successful
_____ moderately successful
_____ had little effect

f. Have you had conversion programs that switched existing clients out of a product with any of these non-traditional guarantees?

_____ yes
_____ no

Would you rate these conversion programs as:

_____ highly successful
_____ moderately successful
_____ had little effect

g. Have you created any benefit guarantees with the purpose of serving as hedges to other guarantees you offer?

_____ yes

Please describe the offsetting hedges: _____

_____ no

2. Please indicate how important any of these non-traditional guarantees have been to achieving your marketing goals, based on the following 1-5 scale:

1: mandatory to sell in our market
2: increases sales significantly
3: increases sales somewhat
4: not as important as other product or compensation factors
5: unimportant

UL

___ with premium no-lapse guarantee
___ with no-lapse guarantee based on shadow fund

VUL

___ with no-lapse guarantee

UL or VUL

_____ Accelerated benefits
_____ Long-term care benefits
_____ Bonus or refund triggered if current charges are increased

Survivorship life

_____ with estate tax unwind
_____ with policy split option

Other UL or VUL guarantees:_____

3. Do you set any limits on new business for products with these non-traditional guarantees?

_____ yes

What are the limits based on: _____

_____ no

4. Do you have, or are considering getting, patents on any of these non-traditional guarantees or related features?
   _____ yes
   _____ no

5. Do you use third-party administration for any of these products?
   _____ yes
   _____ no

   If so, have you had significant problems specifically related to the administration of these non-traditional guarantees?
   _____ yes
   _____ no

6. Have you sought any private-letter rulings concerning these non-traditional guarantees?
   _____ yes. Add specifics: _____
   _____ no

7. Do you believe that any of your company ratings have been negatively affected by offering these non-traditional guarantees?
   _____ yes
   _____ no

8. Please check any of the following which you believe has a significant probability (more than 50% chance) of occurring over the next few years and decreasing your expected profits on products with non-traditional guarantees?

   _____ changes in 1035 activity due to partial 1035's
   _____ changes in lapsation due to increasing life settlement activity (purchase of policies by a third-party)
   _____ reserve changes
   _____ tax law changes
   _____ litigation risks
   _____ other. Specify: _____

9. For which of the following benefits have your profits been lower than anticipated at the time of pricing:

UL
___ with premium no-lapse guarantee
___ with no-lapse guarantee based on shadow fund

VUL
___ with no-lapse guarantee

UL or VUL
_____ Accelerated benefits
_____ Long-term care benefits
_____ Bonus or refund triggered if current charges are increased

Survivorship life
_____ with estate tax unwind
_____ with policy split option

Other UL or VUL guarantees:_____

What has been the primary cause of profits not meeting pricing expectations?

_____ external market performance
_____ policyowner actions
_____ reserve changes
_____ distributor actions
_____ limitations of modeling at the time of pricing
_____ administrative costs of the guarantee features
_____ other: please explain _____

10. Pricing and risk assessment

a. What measures do you use in determining the price and assessing the risks of non-traditional guarantees?

Profit:

____ GAAP ROE
____ other GAAP target. Specify: _____
____ IRR
____ ROI or other return on capital/investment
____ PV of profits
____ other measures. Specify: _____

Risk Measures:

____ required capital
____ value at risk
____ embedded value at risk
____ stress tests
____ other. Specify: _____

b. Are the risks for these non-traditional guarantees incorporated into the pricing process by:

_____ using higher profit targets to reflect the risk
_____ adding margins to the assumptions
_____ setting higher capital allocations
_____ other. Specify: _____

c. Please check the source of your assumptions for the following policyowner actions:

	Withdrawal rates	Lapse rates	Premium deposits	Fund allocations
Internal experience				
External data				
Actuarial judgment				
Assumptions set by corporate parameters				

d. Which of your assumptions vary dynamically within the model?

_____ withdrawal rates
_____ lapse rates
_____ premium deposits
_____ fund allocation
_____ other. Specify: _____

e. Do you model lapses under any of the following adverse conditions:

_____ economic or market changes
_____ distribution channel risks
_____ regulatory or tax changes
_____ changes due to corporate credit rating changes
_____ other. Specify: _____

11. Reinsurance

Do you have reinsurance as a significant part of your risk management program for these non-traditional guarantees?

_____ yes
_____ no

12. Hedging

Do you hedge equity-related risks for these non-traditional guarantees?

_____ yes

If so, what is the primary reason for hedging:

_____ reduce volatility of results
_____ cap losses
_____ minimize reserve and surplus requirements
_____ improve ratings
_____ other. Specify: _____

_____ no

If not, what is the reason?

____ cost
____ lack of availability of appropriate hedges
____ lack of time or expertise to run a hedging program
____ too small a block of business to hedge
____ other. Specify: _____

Do you run your hedging program using:

____ internal resources
____ internal resources using commercial software
____ consultants or other third-party resources to run the program

Which measures do you match for hedging?

____ Delta
____ Gamma
____ Rho
____ Vega
____ other. Specify: _____

Is the hedging area run as a separate profit center within the company?

_____ yes
_____ no

Do you enter into any transactions such as securitizations, swaps, or structured liabilities related to the benefit guarantees?

_____ yes
_____ no

13. Corporate risk management

Does your company do corporate-wide enterprise risk management?

_____ yes
_____ no

Who is in charge of the corporate-wide enterprise risk management:

_____ Chief Risk Officer
_____ Chief Actuary
_____ Chief Financial Officer
_____ other. Specify: _____

14. Do you use any off-shore solutions which are part of your management of the non-traditional guarantees?

_____ yes

_____ reinsurance
_____ financial reinsurance
_____ investment management
_____ private placements
_____ other. Specify: _____

_____ no

SECTION 3: TERM INSURANCE

1. Benefit guarantees

   a. What non-traditional guarantees on term insurance do you offer or plan to offer?

   _____ guaranteed return of premium
   ____ full return
   ____ partial return

   _____ return of premium based on some external index or event
   _____ full return
   _____ partial return

   _____ favorable conversion provisions to other life products

   _____ cash values

   _____ long-term premium guarantee
   Maximum length of guarantee: _____

   _____ guarantees tied to external index or event

   _____ increase in premium triggers bonus or refund

   _____ other types of guarantees. Specify: _____

   b. Do you have the right to change the price or terms of any of these guarantees for inforce business?
   _____ yes
   _____ no

   If yes, which ones can be changed? _____
   Have you ever exercised this right?
   _____ yes
   which ones? _____
   what was the reason? _____
   _____ no

c. Do you expect to significantly reduce the benefit or stop offering any of these guarantees for new business in the next two years?

_____ yes
_____ no

If yes, which benefits do you expect to reduce or stop offering?

_____

Why?

_____

d. Have you ceased to offer any of these benefits within the last two years?

_____ yes
_____ no

If yes, which benefits did you reduce or stop offering?

_____

What was your reason for this change?

_____

e. Have you had conversion programs that updated existing clients into a product with any of these non-traditional guarantees?

_____ yes
_____ no

Would you rate these conversion programs as:

_____ highly successful
_____ moderately successful
_____ had little effect

f. Have you had conversion programs that updated existing clients into a product with any of these non-traditional guarantees?

_____ yes
_____ no

Would you rate these conversion programs as:

_____ highly successful
_____ moderately successful
_____ had little effect

2. Please indicate how important any of these non-traditional guarantees have been to achieving your marketing goals, based on the following 1-5 scale:

    1: mandatory to sell in our market
    2: increases sales significantly
    3: increases sales somewhat
    4: not as important as other product or compensation factors
    5: unimportant

    _____ guaranteed full return of premium
    _____ guaranteed partial return of premium
    _____ return of premium based on some external index or event

    _____ favorable conversion provisions to other life products

    _____ cash values

    _____ long-term premium guarantee

    _____ guarantees tied to external index or event

    _____ increase in premium triggers bonus or refund

    _____ other types of guarantees. Specify: _____

3. Do you set any limits on new business for products with these non-traditional guarantees?

    _____ yes
        What are the limits based on: _____
    _____ no

4. Do you have, or are considering getting, patents on any of these non-traditional guarantees or related features?

    _____ yes
    _____ no

5. Do you use third-party administration for any of these products?

_____ yes
_____ no

If so, have you had significant problems specifically related to the administration of these non-traditional guarantees?

_____ yes
_____ no

6. Have you sought any private-letter rulings concerning these non-traditional guarantees?

_____ yes. Add specifics: _____
_____ no

7. Do you believe that any of your company ratings have been negatively affected by offering these non-traditional guarantees?

_____ yes
_____ no

8. Please check any of the following which you believe has a significant probability (more than 50%) of occurring over the next few years and decreasing your expected profits on products with non-traditional guarantees?

_____ changes in 1035 activity due to partial 1035's
_____ changes in lapsation due to increasing life settlement activity (purchase of policies by a third-party)
_____ reserve changes
_____ tax law changes
_____ litigation risks
_____ other. Specify: _____

9. For which of the following benefits have your profits been lower than anticipated at the time of pricing:

_____ guaranteed return of premium
____ full return
____ partial return

_____ return of premium based on some external index or event
_____ full return
_____ partial return

_____ favorable conversion provisions to other life products

_____ cash values

_____ long-term premium guarantee

_____ guarantees tied to external index or event

_____ increase in premium triggers bonus or refund

_____ other types of guarantees. Specify: _____

What has been the primary cause of profits not meeting pricing expectations?

_____external market performance
_____ policyowner actions
_____ reserve changes
_____ distributor actions
_____ limitations of modeling at the time of pricing
_____ administrative costs of the guarantee features
_____ other: please explain _____

10. Pricing and risk assessment

a. What measures do you use in determining the price and assessing the risks of non-traditional guarantees?

Profit:

____ GAAP ROE
____ other GAAP target. Specify: _____
____ IRR
____ ROI or other return on capital/investment
____ PV of profits
____ other measures. Specify: _____

Risk Measures:

____ required capital
____ value at risk
____ embedded value at risk
____ stress tests
____ other. Specify: _____

b. Are the risks for these non-traditional guarantees incorporated into the pricing process by:

_____ using higher profit targets to reflect the risk
_____ adding margins to the assumptions
_____ setting higher capital allocations
_____ other. Specify: _____

c. Do you run stochastic simulations of mortality?

_____ yes
_____ no

d. Do you model lapses under any of the following adverse conditions:

_____ economic or market changes
_____ distribution channel risks
_____ regulatory or tax changes
_____ changes due to corporate credit rating changes
_____ other. Specify: _____

11. Reinsurance

Do you have reinsurance as a significant part of your risk management program for these non-traditional guarantees?

_____ yes
_____ no

12. Corporate risk management

Does your company do corporate-wide enterprise risk management?

_____ yes
_____ no

Who is in charge of the corporate-wide enterprise risk management:

_____ Chief Risk Officer
_____ Chief Actuary
_____ Chief Financial Officer
_____ other. Specify: _____

13. Do you use any off-shore solutions which are part of your management of the non-traditional guarantees?

_____ yes

- _____ reinsurance
- _____ financial reinsurance
- _____ investment management
- _____ private placements
- _____ other. Specify: _____

_____ no

