LIFE

Research Report

Capital Market Approaches to Funding AXXX Reserves

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EXECUTIVE SUMMARY

There is significant interest among life insurers and reinsurers in financing a portion of statutory reserve requirements for level premium term business through the capital markets. Companies are exploring the potential to use similar structures to finance a portion of the statutory reserve requirements for universal life products with secondary guarantees. However, because of the complexities of the universal life products and the inherent risk factors, the transaction models developed for the level premium term business are not directly transferable to universal life.

In this report, we develop a methodology that may be used to assess the risks in a universal life product with secondary guarantees. The basic methodology provides a means to develop the amount of statutory reserves that might be financed through the capital markets and the amount that would be financed by the insurance company or reinsurer. This methodology relies on a stochastic analysis of the cost of the secondary guarantees and a comparison of the cost of the secondary guarantees with the additional statutory reserve requirement due to the secondary guarantees. The results of our analysis are applicable only for the hypothetical product assumed in our modeling and are dependent on the chosen assumptions and interest rate generator. However, the methodology described in this report should extend beyond this particular example.

BACKGROUND AND SCOPE

Creative structures have emerged utilizing the capital markets to monetize or securitize cash flows from certain blocks of life insurance business. These structures began with the closed block transactions of two recently demutualized life insurance companies and continued with transactions involving level premium term business subject to the reserve requirements of the Valuation of Life Insurance Policies Regulation, referred to as XXX reserves. Discussions with bankers and financial guarantors suggest that there is increasing interest in the marketplace to free up cash and capital in the life insurance industry through capital market financing.

Completed XXX transactions, and those under consideration, create structures allowing life insurers to fund a portion of companies' XXX reserves by accessing the capital markets using short-term financing. These structures are alternatives to the reinsurance route where either letters of credit are utilized to obtain reinsurance reserve credits or assets are placed in trust. Reinsurance solutions have become more expensive recently, and are expected to become more burdensome due to market demands related to new level premium term sales and to the natural increase in reserves for existing policies, which feature a "humpback" XXX reserve pattern.

In addition to looking at financing some portion of the XXX reserves, companies have begun looking for similar solutions for the emerging reserves on universal life insurance products with secondary guarantees. Actuarial Guideline AXXX (also known as Actuarial Guideline 38) addresses reserving issues on universal life products with secondary guarantees, and these reserves are referred to as AXXX reserves. For the XXX solutions applicable to level premium term business, the excess of the statutory XXX reserves over "economic reserves" are financed through these mechanisms. Economic reserves may be defined as gross premium reserves calculated as the present value of expected benefits and expenses over the present value of expected premiums. The underlying structure of the XXX transactions provides a cushion against varying mortality experience. For AXXX business, where the underlying universal life products are more complicated and subject to significant investment as well as lapse and mortality risks, the development of economic reserves is more complicated. In addition, the reserves attributable to AXXX business extend further into the future than for XXX business, where the XXX reserves apply over the level term period (5-30 years). The capital markets solutions for AXXX business will need to recognize this long-term need for financing.

This report provides some background information on the evolution of universal life products and the mechanics of AXXX reserves. While this product information may be well known to certain readers of this report, it provides a product foundation for others outside the life insurance industry working on financing solutions for the industry.

Further, the report considers possible ways to analyze the risks inherent in a universal life insurance product with secondary guarantees. To analyze the risk and suggest approaches that may be considered in financing mechanisms, stochastic projections were developed for a hypothetical universal life product. As discussed later, there is much product variation in the marketplace, and the results illustrated for this hypothetical product may not be applicable to other products. The results will also depend upon the choice of interest rate generator used in the analysis. The purpose of the analysis is not to illustrate a particular level of AXXX reserves that may be financed, but to present a methodology that could be used to analyze various products and reflect various scenario generators.

UNIVERSAL LIFE PRODUCTS WITH SECONDARY GUARANTEES

Universal life products are accumulation-type products with flexible premiums that are accumulated based on the credited interest rates, expense charges, and cost of insurance charges that are set by the insurer subject to certain guarantees such as minimum credited rates and maximum expense charges. Cash values payable on surrender are generally the account values less surrender charges that grade to zero over time. The early generation universal life products provided that the policy would lapse with no value if the account value declined to zero.

With the low interest rate environment over the last few years, there has been a decreasing emphasis on current illustrated cash values in universal life products and increasing emphasis on death benefit guarantees. Secondary death benefit guarantees in universal life products have become increasingly generous over the last few years.

Just a few years ago, universal life products guaranteed that the policy would not lapse in the first three or five years after issue if premiums at least as great as cumulative stipulated premiums were paid. These three- or five-year guarantees lengthened into 10-year, 20-year, and 30-year guarantees. Soon thereafter, some products began guaranteeing that the policy would remain in force through age 65 or even age 100 if stipulated cumulative premiums were paid.

Recently, these lifetime guarantees have become popular, with the premium levels needed to support secondary death benefit guarantees becoming lower and lower. The cash values for these products, assuming current interest crediting rates continue into the future, often go to zero before the guarantee period ends, resulting in a term-like product without cash values in later years.

The earlier generation secondary guarantees featured specified premium levels that were required on a cumulative basis in order to secure the death benefit guarantee. Many of the recent, competitive products with secondary guarantees are instead designed with a "shadow account" feature. This shadow account calculation is independent from the regular account value. It is, in fact, never used to determine cash values, as its only purpose is to determine whether secondary death benefit guarantees are in effect. It may utilize unique credited rates, cost of insurance factors, and loads within the shadow account calculation. With most of these products, if the shadow account is positive, the secondary guarantee requirement is met and the policy will not lapse regardless of a cash value that may not be positive. Through the design of the parameters used in the shadow account calculation, the duration of the secondary guarantee can be controlled. In fact, this was one of the primary reasons for the development of shadow account designs, as companies sought to develop mechanisms that addressed consumer needs and allowed a range of guarantees to be delivered over a continuum of premium scenarios, just as was true for the desire to deliver accumulation values under a range of premium scenarios.

Another feature of most products offering secondary death benefit guarantees is a contractual clause commonly known as a maturity extension provision. Under this provision, if the client maintains coverage in force through age 100, the life insurance is guaranteed to continue in force beyond that point, typically either to age 120 or lifetime. In some cases there is an additional premium assessed for this extension of benefits, but more commonly there is no additional charge. Any cash value that exists in the contract will continue to grow with interest, and the full death benefit is payable when death occurs so long as the extension is in force. Thus, the secondary guarantee may provide not only an extension of benefits between the point in time at which cash values are depleted and age 100, but also beyond age 100.

AXXX RESERVES

In order to address the statutory reserve requirements of certain forms of secondary guarantees not clearly addressed under Regulation XXX, Actuarial Guideline AXXX was promulgated, effective December 1, 2003 (or, in some cases, earlier). The formula-based calculations under AXXX generally produce reserves that reflect principles consistent with traditional life reserving standards, applied to a product that is more complex than traditional plans.

At its October 22, 2004 conference call, the NAIC's Life and Health Actuarial Task Force (LHATF) voted to pursue a change or clarification to AXXX. LHATF voted to expose a proposal developed by the New York Insurance Department for consideration as a short-term fix to AXXX. It is not clear at this time whether the newly exposed proposal will be in effect by year-end 2004.

AXXX currently defines reserves for universal life products with secondary guarantees using a nine-step process. A brief description of the logic of the AXXX mechanics follows:

1. Calculate the traditional basic reserves and deficiency reserves appropriate as if minimum premiums needed to keep the policy in force were paid under the contract.

2. Determine the actual payments in excess of the minimums. Notably, for plans designed with shadow account structures, the shadow account value is deemed to be the excess payment.

3. Determine the single payment at that valuation date that would be necessary to fund the remaining secondary guarantee, assuming that minimum premiums had been paid to that point.

4. Determine the ratio (R) as the excess payments (Step 2) divided by the single payment as calculated in Step 3.

5. Determine the "net amount of additional premiums" by multiplying the ratio (R) by the difference between the net single premium (the "traditional" reserve required for a single premium policy using prescribed valuation mortality and interest rates) and the initial basic and deficiency reserves (Step 1).

6. The final deficiency reserve is determined as (1-R) times the initial deficiency reserve (Step 1).

7. The final total reserve is the lesser of: a) the net single premium (using prescribed valuation mortality and interst rates, as described in Step 5) and b) the quantity (initial basic and deficiency reserves plus the net amount of additional premiums), less applicable surrender charges.

8. The final total reserve is not allowed to drop below the sum of the initial basic reserve plus deficiency reserve (Step 1), and traditional Commissioners Reserve Valuation Method (CRVM) reserves serve as a further floor. CRVM reserves use prescribed valuation mortality and interest rates, and use methodology reflecting actual cash values in the policy as of the valuation date.

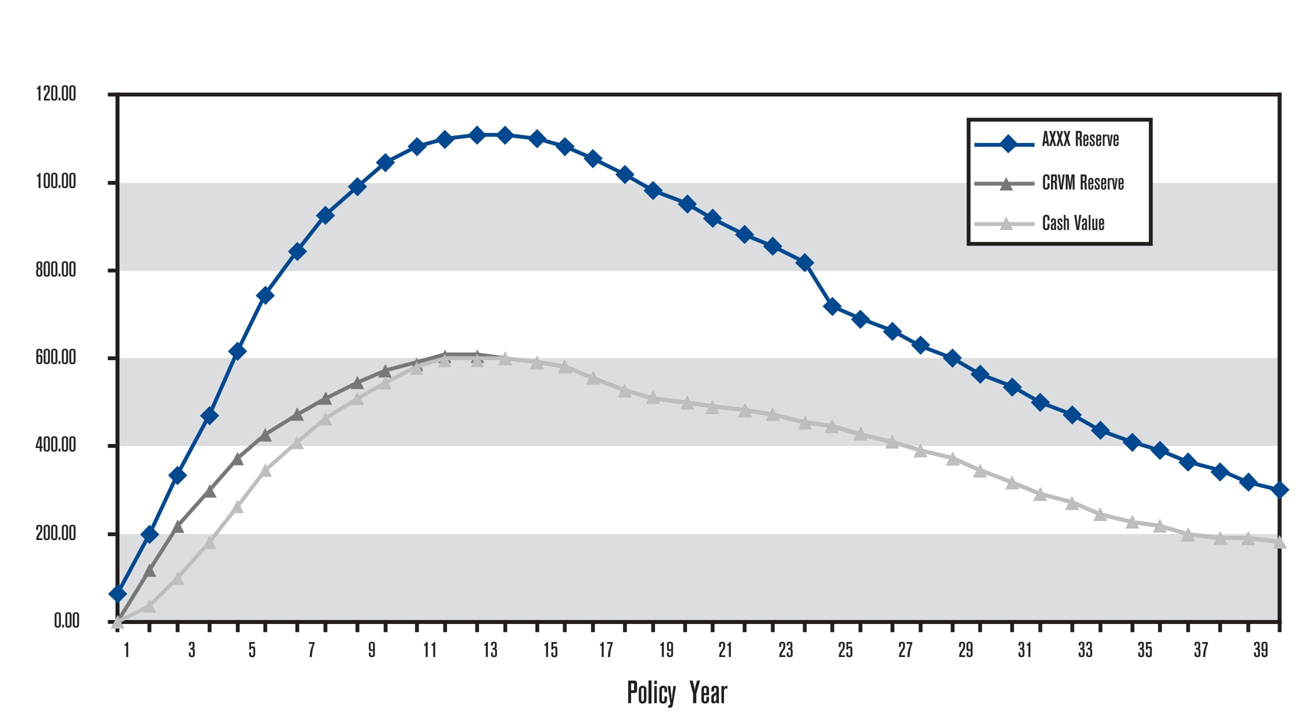
9. Final basic reserves are the difference between final total reserves and final deficiency reserves

In summary, the approach inherently determines traditional reserves appropriate for a minimum premium scenario, and adds to that a proportion of the excess of traditional reserves for a single premium scenario over those minimum premium reserves, where the proportion is the actual excess payments divided by the single payment necessary to fund the remaining secondary guarantees.

Figure 1 presents a comparison of various measures for a hypothetical universal life product with secondary death benefit guarantees, assuming a continuation of the current interest environment. This product features a guaranteed premium level that is generally competitive, but not in the most aggressive tier in this market, and a shadow account design and parameters that are not particularly aggressive in terms of suppressing expected redundancies in the resulting AXXX reserves. (See Appendix A for more information on the hypothetical product.) As the results shown later in this report indicate, the formulaic AXXX reserves for the product are conservative relative to obligations of the insurer. While this comparison and the analysis that follows provides a framework for assessing the risks inherent in these types of products, it should be understood that results of such analysis are product dependent, and that the results presented here are only representative for this particular product design.

FIGURE 1

Comparison of Various Measures for a Hypothetical UL Product with Secondary Guarantees



For a product without any secondary guarantees, the required statutory reserves would be the CRVM reserves. As such, the difference between the AXXX reserves and the CRVM reserves represent the additional reserves for the secondary guarantees.

Product evolution has adapted under AXXX, and it is becoming apparent that different product designs may generate different formulaic AXXX reserves, despite what may be similar premiums and guarantees among those designs. Typically, AXXX reserves contain significant redundancies relative to the expected obligations of the insurer. However, significant evolution is occurring in product design structures and parameters on products featuring these guarantees, with potentially significant variations in formulaic AXXX reserve levels among plans with similar levels of guaranteed premiums.

ANALYSIS FOR CAPITAL MARKETS FINANCING OF AXXX RESERVES

Methodology and Assumptions

To analyze an appropriate level of reserves to be held for secondary guarantees, a model was developed of the hypothetical universal life product described above. (See Appendix A for product description.) The model projects future experience under the product for a cohort of business issued in a single year. The experience of this cohort is projected forward until all of the policies have terminated through lapse, death, or maturity.

MG-ALFA® was used to develop projections of the product cash flows, such as premiums, expenses, death benefits, surrender benefits, as well as account values, cash values, CRVM reserves, and AXXX reserves. Cash flows and reserves were projected under two conditions: 1) assuming the secondary guarantees and the 3% minimum credited rate for the product apply; and 2) assuming no secondary guarantees or minimum crediting rates. For the purpose of this analysis, death benefits that resulted from the secondary guarantees as well as any surrender benefits or death benefits that resulted from the minimum guaranteed credited rates were captured by taking the difference between the cash flows projected under these two conditions.

The differences in these cash flows are referred to as the "guaranteed cash flows." We develop the present value of the future guaranteed cash flows at each policy anniversary and compare those amounts to the AXXX reserves in excess of CRVM reserves. The guaranteed cash flows develop towards the end of the projection period for each issue age, because the secondary guarantees allow for the continuation of death benefit coverage.

The primary assumption that supports the comparison of the present value of guaranteed cash flows (PVGC) with the excess of AXXX reserves over CRVM reserves is that the additional reserves required by AXXX are intended to provide for the guarantees. In other words, we assume that the CRVM reserve is an adequate reserve for a policy with none of these guarantees. That assumes that the cost of insurance (COI) charges are adequate to support the annual cost of mortality in each year and the investments will provide a positive investment spread in each year and that the expense charges are sufficient to pay the current year expenses. To the extent that CRVM reserves include some provision for minimum credited rates, there will be some overlap between CRVM reserves and the PVGC.

The projections are repeated for 500 paths of future interest rates described in Appendix B. We used 500 paths because the results for this particular product did not vary considerably when using more than 500 scenarios

The interest rate scenarios were developed from the NAIC scenario generator that is required for risk based capital (RBC) analysis for interest sensitive products (C3 Phase 1). The scenarios have a mean reversion target that is above 5.75%. The resulting scenarios are not drastically different from risk neutral scenarios that would be developed from forward rates, but are different from neutral expectations scenarios that have a mean reversion target of the initial rates.

As described previously, the purpose of this analysis is not to illustrate a particular level of AXXX reserves that may be financed, but to present a methodology that could be used to analyze various products and reflect various scenario generators. This analysis could be developed using a different scenario generator and a different number of interest rate paths.

Summary of Results for Hypothetical Product

The results of our analysis are summarized at several durations in Tables 1 and 2. Table 1 provides the values for the average over all 500 scenarios. The last column of Table 1 shows the ratio of the PVGC to the excess of the AXXX reserves over the CRVM reserves ("excess AXXX reserves"). Table 1 shows that the excess AXXX reserves are less than the PVGC for year one and two, but by year three the excess AXXX reserves grew sharply and now exceed the PVGC. By year five, the excess AXXX reserves grew to be more than 2.5 times the PVGC, suggesting that on average 60% of the excess AXXX reserves are redundant at that point. Using the average of all scenarios there is still a significant redundancy in the reserves in year 25. Because of the small number of issue ages assumed in the model, there are some discontinuities in the results beyond year 25. A more robust model would produce smoother results.

TABLE 1

Average Over 500 Scenarios					
Policy Year	AXXX Reserves	CRVM Reserves	PVGC	AXXX – CRVM	PVGC/AXXX- CRVM
1	6.48	0.21	7.57	6.27	121%
2	19.90	12.09	8.06	7.81	103
3	33.61	22.20	8.56	11.41	75
4	46.87	30.48	9.07	16.39	55
5	61.44	37.27	9.60	24.17	40
10	104.72	57.15	12.53	47.57	26
15	109.91	59.20	16.39	50.71	32
20	95.19	49.81	20.56	45.38	45
25	71.53	44.47	17.96	27.06	66
30	56.58	34.64	12.80	21.94	58
40	30.11	18.09	12.98	12.02	108

The same calculation is shown in Table 2, except that instead of the average results over 500 scenarios, the 98th percentile result is shown. The percentile is determined by ranking the total value of the PVGC at issue across all the scenarios. The 98th percentile result is the 10th worst result out of the 500 scenarios. At the 98th percentile, Table 2 shows that the excess AXXX reserves are less than the PVGC for years one through five, but exceed the PVGC in year 10. At the 98th percentile, 39% of the excess AXXX reserves are redundant at year 10. At the 98th percentile, the redundancy is nearly eliminated by the end of the 25th year.

TABLE 2

98TH PERCENTILE OF 500 SCENARIOS

Policy Year	AXXX Reserves	CRVM Reserves	PVGC	AXXX – CRVM	PVGC/AXXX- CRVM
1	6.48	0.21	20.19	6.27	322%
2	19.88	12.10	21.51	7.78	276
3	33.65	22.37	22.85	11.28	203
4	47.37	30.95	24.22	16.42	148
5	62.78	38.19	25.61	24.59	104
10	112.94	59.44	32.58	53.50	61
15	120.95	58.17	39.69	62.78	63
20	106.70	45.67	45.02	61.03	74
25	80.23	35.67	44.04	44.56	99
30	62.68	19.99	41.88	42.69	98
40	32.06	7.78	28.97	24.28	119

Figure 2 shows the relationships between AXXX reserves, CRVM reserves, and the PVGC for the average of the 500 scenarios. The dark grey area represents the CRVM reserves and the blue area represents the redundant reserves for the average of the 500 scenarios. The light grey area in the middle represents the amount of reserves needed on average to provide for the guaranteed benefits (the PVGC).

FIGURE 2

COMPARISON OF RESERVE AMOUNTS

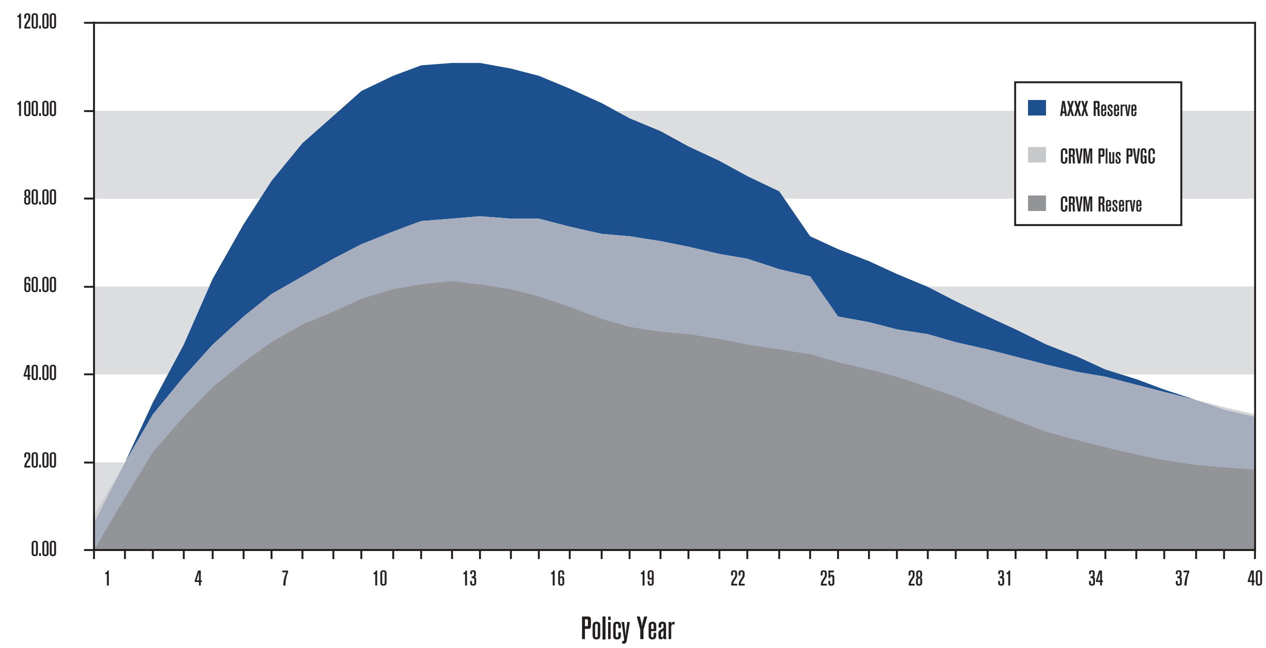
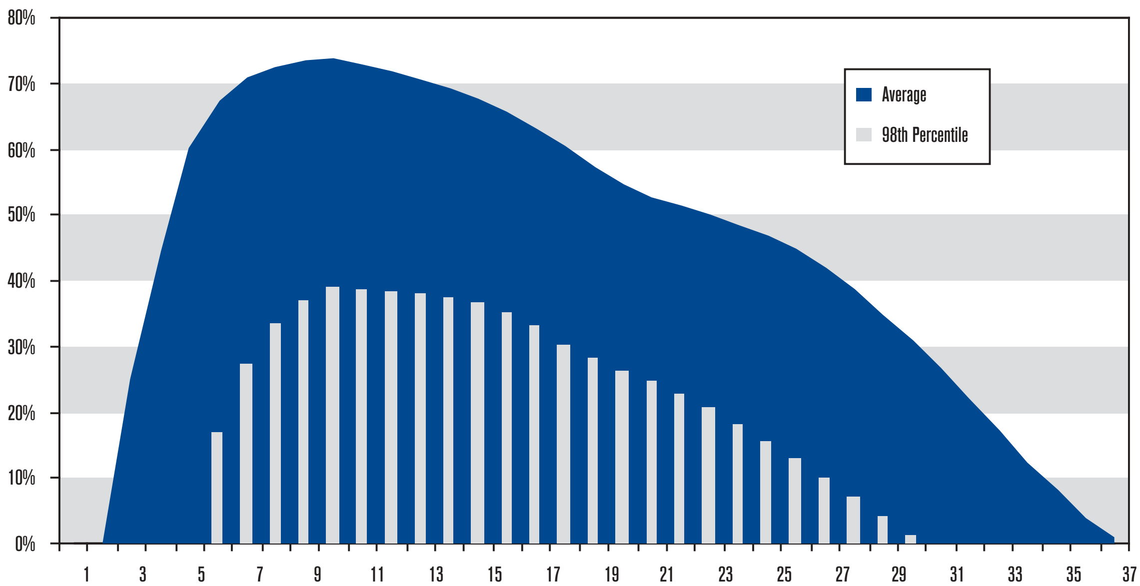


Figure 3 shows the percentage of AXXX reserves that are redundant, on average (the solid area) and at the 98th percentile (bars). With regard to the interest rate risks that are represented by the 500 scenarios, there is a high degree of certainty that a significant portion of the AXXX reserves is redundant.

FIGURE 3

PERCENT REDUNDANT EXCESS AXXX RESERVES



APPLICATION TO CAPITAL MARKET FINANCING

Calculations such as these could become the basis for financing a portion of AXXX reserves. The redundant reserves from this type of analysis could be the amount that would be funded by some type of external financing operation. One possible approach is outlined in the following steps.

1. The universal life business with secondary guarantees would be reinsured into a captive insurance company.

2. Projections would be developed to determine the AXXX reserves, CRVM reserves, and PVGC for all durations for a specified set of scenarios.

3. Based on the desired level of security in the financing structure, the amount of surplus in the captive and the risk percentile (i.e., average, 98th percentile, or other) for the valuation of the guarantees would be determined.

4. From the scenario results and the risk percentile, a set of factors would be developed that defines the redundant reserves as amounts per 1000 that vary by duration.

5. The reinsurance agreement with the captive would be developed so that the issuing company would be responsible for funding the captive up to the level of economic reserves, defined as the AXXX reserves less the redundant reserves determined in Step 4.

6. A surplus note or other financing would be used to fund the redundant reserves. The security structure would allow the financing program to have the desired rating level through a guarantee or other arrangement.

7. Periodically throughout the life of the program, the analysis would be repeated and the factors for determining the redundant reserves would be recomputed and reset if necessary.

Our analysis focuses on the interest rate risks that drive the PVGC. The periodic redetermination of redundant reserves in Step 7 is needed to maintain the same level of security throughout the life of the program, even in the event that there are adverse interest rate trends over a long period of time. This redetermination is part of the structure so that the interest rate risk from the guarantees is ultimately borne by the insurance company, not the lenders or ultimately the guarantor.

Here is an example of how the redetermination might work:

Assume that over the 10 years since issue, interest rates have held exactly at the point where they were at the start of the program. The initial agreement calls for retesting of the PVGC no less frequently than every 10 years. Table 3 shows the results of the retesting at the end of year 10.

TABLE 3

	Average of 500 Scenarios			98th Percentile of 500 Scenarios		
Year 1	PVGC At Issue	PVGC At Year 10	Change	PVGC At Issue	PVGC At Year10	Change
10	12.53			32.58		
11	13.21	18.09	4.88	34.00	28.77	(5.23)
12	13.92	19.06	5.14	35.40	30.31	(5.09)
13	14.69	20.09	5.40	36.78	31.91	(4.87)
14	15.51	21.17	5.66	38.20	33.53	(4.67)
15	16.39	22.32	5.93	39.69	35.17	(4.52)
16	17.33	23.54	6.21	41.23	36.85	(4.38)
17	18.33	24.84	6.51	42.86	38.55	(4.31)
18	19.41	26.02	6.61	44.57	40.32	(4.25)
19	20.31	26.03	5.72	45.12	41.75	(3.37)

Under the average of the 500 scenarios, the results of the retesting indicate that the PVGC of $12.53 developed at issue is inadequate at the end of 10 years. This result is obtained because the average of the 500 scenarios over the first 10 years is not as adverse as a continuation of the current low interest environment, due to the mean reversion assumption in the scenario generator (see Appendix B for a description of the scenarios.) Under the terms of the structure, the insurance company is required to increase funding over the next several years to make up the shortfall.

If the risk percentile for the transactions had been the 98th percentile, the retesting would have had a different result. The PVGC at year 10 would be $32.58 based on the modeling at issue. The update test after 10 years shows that no additional PVGC is needed to maintain the 98th percentile level of security. This result is obtained because the scenario representing the 98th percentile value is more adverse than 10 years of level interest at the low starting level.

This illustrates an aspect of the difference between the different levels of security in the structure. If a higher level of security is selected, it is less likely that there will be any need for future increases in security. However, there will be less excess AXXX reserves available for financing, making the transaction less efficient from the insurance company's perspective.

These sample calculations were performed without referencing the impact of margins in COIs or spreads in the interest credited other than how they would be affected by portfolio rates below the guaranteed rates. Those spreads are one source of earnings that the insurance company may use to fund the PVGC. Testing should be performed to determine the adequacy of those earnings to fund the PVGC. In addition, hedging programs could be employed to reduce the likelihood of investment performance that triggers the guaranteed cash flows. Such hedge programs could be incorporated into the deal structure and could be reflected in the determination of the PVGC, potentially greatly increasing the amount of the AXXX reserves that can be determined to be redundant.

SUMMARY

The methodology described above provides a means to determine a portion of AXXX reserves that might be financed through the capital markets. While the actual results may vary considerably by product, interest rate scenarios and risk percentile, the methodology provides a framework for assessing the potential financing options.

APPENDIX A

Description of Hypothetical Product and Model Development

The liability model consists of a single model plan with three model issue ages and three risk classes. The level no-lapse guaranteed premium levels, commission levels, expense levels, and primary account value loads/charges, and shadow account designs are representative of those found in a median level competitive product offered in the Universal Life with Secondary Guarantee market. The level no-lapse guaranteed premium is the level premium that, if paid each policy year, keeps the shadow account positive and the contract in force until attained age 100 where the shadow account value then reaches zero.

All policies are modeled as males with death benefit option one. The model issue ages are 35, 55, and 75. The risk classes are preferred nonsmoker, standard nonsmoker, and preferred smoker. Combining the three issue ages with the three risk classes produces nine model cells, which are assumed to have the following distribution by face amount.

TABLE A1

DISTRIBUTION BY FACE AMOUNT

Risk Class	Issue Age 35	Issue Age 55	Issue Age 75	Subtotal By Risk Class
Preferred Nonsmoker	19.5%	27.5%	8.0%	55.0%
Standard Nonsmoker	7.5	17.5	10.0	35.0
Preferred Smoker	3.0	5.0	2.0	10.0
Subtotal By Issue Age	30.0%	50.0%	20.0%	100.0%

Each of the nine cells has a proportionate share of $1.5 million of face amount and pays level premiums equal to the no-lapse guaranteed premium. All surviving policyholders are assumed to die once they reach the end of the premium-paying period at attained age 100. Lapses are set to zero when the secondary guarantees are allowing the policy to remain in force. The pricing horizon was set to attained age 100 since these products are sold as death benefit-oriented products and are, for the most part, intended to be held until the policy expires. Primary account values reach zero, under base pricing assumption, on average around attained age 90-93.

The shadow account structure was designed, for each modeled cell, with its own percent of premium loads, per unit charges, per policy fees, cost of insurance charges, and credited interest rates. Per unit charges and per policy fees were set at the same levels utilized by the primary account value. Percent of premium loads are applied in all policy years and are level by duration. Credited interest rates consist of a base interest rate, which does not vary by cell, and a modest bonus interest rate that varies by cell. Also, the shadow account parameters were ultimately designed to minimize deficiency reserves as they are not tax efficient.

APPENDIX B

Description of 500 Interest Rate Scenarios

The interest rate scenarios used in our analysis were developed using the scenario generator available from the NAIC for Life Insurance Company Risk Based Capital (C3 Phase I) calculations. This generator is calibrated to long-term historical averages in terms of volatility of short-term and long-term rates and the correlation between short-term and long-term rates. The generator also is set to a mean reversion target that is based on historical averages. For 10-year Treasuries, that target is between 6.75% and 7.00%. The generator uses an initial yield curve as its primary input. Standard assumptions were used for all other parameters as described above. The initial yield curve was based on the treasury rates for May 3, 2004. Yields on intermediate Treasuries were interpolated.

Five hundred scenarios were generated for 50 years. Calculations beyond the 50th year assume the interest rates from year 50. Rates were generated and used for the entire term structure. Table B2 looks at the distribution of the resulting 10-year treasury yields.

The 2% value of 12.69% means that only 2% of the rates are higher than 12.69%. The 98% value means that 98% of the rates are higher than 2.53% for the 10-year treasuries.

TABLE B1

Term to Maturity	May 3, 2004 Treasury Yields
3 month	0.98%
6 month	1.16
1 year	1.54
2 year	2.31
3 year	2.75
5 year	3.61
7 year	3.97
10 year	4.50
20 year	5.27
30 year	5.27

TABLE B2

Summary of 10-Year Treasury Rates	
Average	6.03%
Std Dev	2.48
Min	1.22
Max	26.46
2%	12.69
5%	10.73
10%	9.27
15%	8.41
25%	7.30
35%	6.50
50%	5.52
65%	4.69
75%	4.21
85%	3.79
90%	3.49
95%	3.01
98%	2.53

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