THE CASH FLOW OF A RETROSPECTIVE RATING PLAN

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Abstract

With current methodology, the parameters of a retrospective rating plan are calculated to place the plan in balance on an underwriting basis. This paper provides a way of calculating the present value of the retrospective premium. Using this methodology, one can compare the expected profitability of various retrospective rating plans on a discounted or operating basis. This includes paid loss retros. It is also possible to determine the parameters of a plan that will yield a predetermined operating profit.

This paper is an outgrowth of a project which I directed during my final year at CNA Insurance Companies. I worked very closely with John Meeks and Steve Maguire in developing the conceptual basis for what we called the "Account Pricing System." Many of these ideas originated with Brad Alpert before I was on this project. Steve and Ron Swanstrom wrote a program which made these ideas very workable in a production environment.

1. INTRODUCTION

In recent years, the state of the property and casualty insurance industry could be characterized by three highs: high combined ratios, high interest rates, and a high degree of competition. Insurance company managers know that a great deal of investment income can be made by writing insurance, and they are willing to lower prices in order to do this.

The question to be asked, then, is how much can rates be lowered and still maintain an acceptable overall profit? It should be noted that, in practice, actuaries do not have complete control of the pricing process. Underwriting and marketing personnel have considerable input. If actuaries do not calculate the contribution of investment income to the profitability of a line of insurance, someone else will. And the resulting "calculation" may amount to no more than a reaction to competitive pressures.

The question is not whether to reflect investment income in the calculation of rates. Instead the question is *how* to reflect investment income in the calculation of rates.

This paper considers the effect of investment income in the choice of the parameters of a retrospective rating plan. With current methodology, the parameters of a retrospective rating plan are chosen to place the plan in balance on a nominal, or underwriting basis. By this we mean that the expected retrospective premium is equal to the sum of the losses, expenses, and the anticipated profit. However, it is possible for different plans to have the same expected premium and have different cash flows.

For example, a plan with no maximum will have premium flowing in as long as losses develop, while a plan with a low maximum will stop producing premium as the insured breaks the maximum. Not all insureds will break the maximum, but there will, on average, be a faster premium flow for the low maximum plan because of the higher basic and the increased number of insureds who do break the maximum.

Other factors, such as the loss conversion factor and the minimum premium factor will also affect the cash flow of a retrospective rating plan.

This paper will provide a way of calculating the present value of the retrospective premium. Using this methodology, one can compare the profitability of various retrospective rating plans on a discounted or operating basis. This method also applies to paid loss retros. It is also possible to calculate parameters of a plan that will yield a predetermined operating profit.

The principal tool used will be the collective risk model. Excess pure premiums will be calculated for the insured at various stages of development. One can then calculate the expected retrospective premium at each stage, and obtain the present value of the retrospective premium.

This technique will enable the insurer to offer a standard incurred loss retro which is competitive with a paid loss retro. This alternative could help relieve some of the pressure that the Internal Revenue Service is putting on paid loss retros. In addition, it will become possible to price a retro with loss development factors. This will minimize the size of retrospective adjustments as time passes.

We begin by defining the parameters of a retrospective rating plan.

2. THE PARAMETERS DEFINED

The retrospective premium, R, for an insured is given by the following formula [1]:

$$R = (B + c \cdot E + c \cdot L) \cdot t.$$

R is subject to a maximum of G and a minimum of H.

B is the basic premium. Traditionally, B covers general expenses, profit, and the insurance charge (i.e., the net cost of the minimum and maximum premium provisions). There is no particular reason why B has to be set equal to these cost provisions. In its pure form, B is simply an amount used to determine the retrospective premium.

The factor c is called the loss conversion factor. Traditionally, c covers the loss adjustment expenses. Again, there is no reason why it has to be set equal to a loss adjustment factor. In its pure form, c is simply a factor used to determine the retrospective premium.

Many retrospective rating plans provide that no claim amount over a specified loss limit shall be used to calculate the retrospective premium. In this case, the expected value of the losses resulting from this provision must be added to the retrospective premium. This amount is denoted by E.

L represents the actual losses, subject to the per claim loss limit, incurred under the plan. Premium taxes are provided for by the factor t.

In order to keep this paper as simple as possible, we will not consider the effect of loss limits and premium taxes until the end of the paper. We shall also ignore the minimum premium. This results in a simplified formula for the retrospective premium:

$$R = B + c \cdot L,$$

subject to the maximum, G.

The timing of the retrospective premium payments is of particular importance. Recall that some claims are open a long time before final settlement. Thus, incurred losses are necessarily estimates of the final claims costs. Experience has shown these estimates are usually low, so one should expect the retrospective premium to increase over time. The first calculation is based on losses reported eighteen months after the effective date of the policy. Subsequent calculations are performed on a yearly basis. Payments typically lag three months behind the retrospective premium calculations.

It is usually required to make a premium payment before the first retrospective adjustment. Traditionally, this payment has the standard premium due on the effective date of the policy. More recently, the trend has been to pay an amount totaling less than the standard premium in installments.

We will be following a single hypothetical insured throughout this paper. The loss and expense information for this insured is given in the following table.

TABLE 1

	Nominal	Present Value at 8%
Expected Incurred Losses	$1,000,000	$820,000
Expected Loss Adj. Exp.	100,000	87,000
Other Expenses	57,500	55,000
Total	$1,157,500	$962,000

The expected incurred losses for each retrospective adjustment period are given in the following table.

TABLE 2

Retrospective Adjustment	Expected Incurred Losses
#1 @ 18 months	$833,333
#2 @ 30 months	946,970
#3 @ 42 months	975,610
#4 @ 54 months	986,193
#5 @ 66 months	991,080
#6 @ 78 months	996,016
#7 @ 90 months	1,000,000

In order to calculate the average retrospective premium, one needs to have tables of excess pure premiums which correspond to each retrospective adjustment. These tables are provided in Exhibit 1. The Heckman-Meyers algorithm [2] was used to generate these tables. While the input for this algorithm could be provided, it seems just as easy to assume the tables are given. These tables provide excess pure premiums for loss amounts in increments of $10,000. Linear interpolation can be used to calculate excess pure premiums for loss amounts that are not a multiple of $10,000.

The average retrospective premium is calculated in the following manner [3]. Define the effective maximum to be equal to $(G - B)/c$, and let X be the excess pure premium for losses over the effective maximum. Then, the average retrospective premium is given by:

$$E[R] = B + c \cdot (E[L] - X).$$

The average retrospective premium must be calculated for each evaluation period.

As an example, assume B = \$232,450, G = \$1,500,000, c = 1.1, and $E[L]$ = \$1,000,000. Then the effective maximum equals \$1,152,320. By linear interpolation on Exhibit 1 (90 months), we find X = \$131,775 and $E[R]$ + \$1,187,500.

3. THE STANDARD INCURRED LOSS RETRO

We first calculate the expected underwriting profit for a standard incurred loss retro. We need only consider the seventh (final) retrospective adjustment for this calculation.

TABLE 3

BASIC	\$232,450
L.C.F.	1.1
MAXIMUM	\$1,500,000
E[R] @ 90 MTHS.	1,187,500
LOSS & EXPENSE	1,157,500
UNDERWRITING PROFIT	30,000

This plan was designed to yield approximately the 2.5% underwriting profit that is budgeted in standard Workers' Compensation rate filings.

Next, we calculate the expected operating profit for the same plan assuming an effective annual interest rate of 8%. That is to say, for example, that a payment due in three months is discounted at a rate of $1.08^{0.25}$. A deposit premium of \$960,000 is to be payable in six quarterly installments of \$160,000. The present value of the deposit premium is \$915,410. Additional amounts of

premium due to retrospective adjustments are assumed to be paid three months after the calculation of the retrospective premium.

TABLE 4

BASIC	$232,450
L.C.F.	1.1
MAXIMUM	$1,500,000
DEPOSIT	960,000
E[R] @ 18 MTHS.	1,078,380
@ 30 MTHS.	1,155,720
@ 42 MTHS.	1,173,210
@ 54 MTHS.	1,179,480
@ 66 MTHS.	1,182,340
@ 78 MTHS.	1,185,200
@ 90 MTHS.	1,187,500
P.V. RETRO PREMIUM	1,103,720
P.V. LOSS & EXPENSE	962,000
OPERATING PROFIT	141,720

In this example we see that the standard rating method yields an operating profit of nearly 12% of the ultimate average retrospective premium. This is fine if the competition will allow it. If not, the insurance company management must decide what operating profit to seek.

Suppose management decides to seek an operating profit of $100,000. Perhaps there is a vague notion that an underwriting profit of $30,000 already anticipates a certain amount of investment income, and is not appropriate for an operating profit. Anyway, the question becomes one of selecting the basic premium that yields the desired operating profit. This can be done by repeating the calculations of Table 4 on a trial and error basis, although a numerical method may yield the desired solution more quickly [4]. The results of this process are in the following table.

TABLE 5

BASIC	$167,150
L.C.F.	1.1
MAXIMUM	$1,500,000
DEPOSIT	960,000
E[R] @ 18 MTHS.	1,024,100
@ 30 MTHS.	1,106,410
@ 42 MTHS.	1,125,210
@ 54 MTHS.	1,131,970
@ 66 MTHS.	1,135,050
@ 78 MTHS.	1,138,140
@ 90 MTHS.	1,140,620
P.V. RETRO PREMIUM	1,062,000
P.V. LOSS & EXPENSE	962,000
OPERATING PROFIT	100,000

Having described how to select the basic premium which yields a predetermined operating profit, it should be pointed out that it is possible to fix the basic premium and select the loss conversion factor which yields a predetermined operating profit.

Certain other cash flow provisions of a retrospective rating plan are often subject to negotiation between insurer and insured. Thus it seems appropriate that we show how to account for them.

4. RETRO DEVELOPMENT FACTORS

An optional provision of most retrospective rating plans is to adjust the incurred losses to their ultimate value by means of a loss (or retro) development factor. An advantage to the insured is that the retrospective premium is close to its ultimate value at the first retrospective adjustment. A disadvantage is that the insured must pay the premium sooner. To overcome this disadvantage, the insurer can offer to lower either the basic premium or the loss conversion factor.

In the following table we consider the latter option. The deposit premium is to be paid in installments as before. Although several retrospective adjustments are made, the contribution of the later adjustments is assumed to be negligible. The final table of excess pure premiums in Exhibit 1 (evaluated at 90 months) was used to calculate the average retrospective premium at the first adjustment.

TABLE 6

BASIC	$167,150
L.C.F.	1.0775
MAXIMUM	$1,500,000
DEPOSIT	960,000
E[R] @ 18 MTHS.	1,127,730
P.V. RETRO PREMIUM	1,062,000
PV. LOSS & EXPENSE	962,000
OPERATING PROFIT	100,000

The results of this calculation should be directly comparable with the previous calculation (Table 5). The introduction of retro development factors caused about a 1.1% decrease in the average retrospective premium on a nominal basis.

The accuracy of this calculation depends upon our ability to calculate the proper loss development factors. Even if we get the correct overall loss development factors, changes in the shape of the aggregate loss distribution over time will affect the average retrospective premium. The author suspects that the result, over time, will be a thicker tail for the aggregate loss distribution, a higher excess pure premium, and a slight decrease in the average retrospective premium. Losses which are re-valued upward will be limited by the maximum premium, while losses which are valued downward will be unaffected. A full treatment of this effect is beyond the scope of this paper.

5. PAID LOSS RETROS

A very popular rating plan in recent years has been the so called "paid loss retro." While the details of the financial transactions may vary, a typical plan could work as follows. A basic premium is paid, possibly in installments. The retrospective premium based on paid losses is continuously paid from a special

fund set up by the insured. At some point in time, usually 54 months after the effective date, the plan switches over to an ordinary incurred loss retro.

The continuous adjustment of the retrospective premium presents a technical problem. There is always the possibility that the insured will break the maximum on paid losses before the 54 month switchover. This could, in theory, require daily tables of excess pure premiums. In practice, the possibility of breaking the maximum before the switchover is considered remote, and is ignored in the following calculations. The average retrospective premium can then be estimated using ordinary loss payout patterns.

The effect of this simplifying assumption would be to overstate the average retrospective premium before the switchover. It will be corrected at the 54 month adjustment. The end result will be to overstate the present value of the average retrospective premium by the amount of interest earned on the excess pure premium before the switchover. This should be a negligible amount.

Let us assume that our hypothetical insured is expected to have paid $800,000 in losses by the switchover time, and that the present value of these payments is $720,000. Let us also assume that the basic premium is paid on the effective date of the plan. The following table describes the plan in detail.

TABLE 7

BASIC	$ 215,170
L.C.F.	1.1
MAXIMUM	$1,500,000
E[PAID R]	1,095,170
E[R] @ 54 MTHS.	1,167,130
@ 66 MTHS.	1,170,050
@ 78 MTHS.	1,172,980
@ 90 MTHS.	1,175,320
P.V. E[PAID R]	1,007,170
P.V. RETRO PREMIUM	1,062,000
P.V. LOSS & EXPENSE	962,000
OPERATING PROFIT	100,000

The results of this calculation should be directly comparable to the straight incurred loss retro (Table 5). The paid loss provision caused about a 3% increase in the average retrospective premium on a nominal basis.

6. EXCESS LOSS PREMIUM AND TAX MULTIPLIER

We did not consider the excess loss premium or the tax multiplier in the above calculations. The intent was to keep the discussion as simple as possible. We now show how to modify the calculation to take these into account.

On the premium side of the calculation, the only adjustment needed to handle the loss limit is to input a limited claim severity distribution into the Heckman-Meyers algorithm.

No adjustment is needed on the loss and expense side. Make note that the present value of the unlimited losses is still used.

A wrinkle in the above adjustment occurs when the excess layer is reinsured and one wants to incorporate the cost of reinsurance in the pricing. In this case one takes the sum of the present value of the limited losses and the cost of the reinsurance. This sum is used in place of the present value of the unlimited losses. A note of caution: the payout pattern for limited losses is faster than that of unlimited losses.

Premium taxes are paid on the basis of written premium. One should note that retrospective adjustments are also adjustments in written premium. The present value of the premium taxes can be calculated by using the average retrospective premium at each adjustment.

The following question should be asked at this point. Do we really need to have separate factors in the retrospective rating plan for excess losses and premium taxes?

Tax multipliers are not used in guaranteed cost plans, so why use them for retrospective rating? Rates for other guaranteed cost plans reflect premium taxes, and so could the basic premium and the loss conversion factor. Skurnick [5] put the excess premium into the basic premium for the California Table L, and there is no reason why this could not be done for all retrospective rating plans.

What really matters is that the present value of the retrospective premium is equal to the profit plus the present value of the losses and expenses. This can be accomplished by a proper selection of the basic premium and the loss conversion factor. The result will be a simpler formula for retrospective rating.

7. CONCLUSION

This paper is written under the premise that an explicit calculation of investment income is superior to the implicit recognition of investment income that some suggest is in many present rating formulas. We do not attempt to determine the proper operating profit. This task belongs to insurance company management and/or regulators. It does not belong to some ratemaking formula based on underwriting profit.

We have provided a methodology for finding the expected operating profit for a retrospective rating plan. This methodology is presently used by at least one major insurance company.

The author suspects that the more complicated versions of retrospective rating, such as paid loss retros, arose because the present plan does not allow for investment income. Now that the various versions of retrospective rating can be rated on a comparable basis, it is hoped that the more complicated versions will no longer be necessary. Retrospective rating can be made simple.

REFERENCES

[1] National Council on Compensation Insurance: *Retrospective Rating Plan D.*

[2] P. E. Heckman and G. G. Meyers, "The Calculation of Aggregate Loss Distributions from Claim Severity and Claim Count Distributions," *PCAS* LXX, 1983, p. 22.

[3] G. G. Meyers, discussion of "An Analysis of Retrospective Rating" by M. E. Fiebrink, *PCAS* LXVIII, 1981, p. 113.

[4] R. L. Burden, J. D. Faires, and A. C. Reynolds, *Numerical Analysis,* 2nd Edition, Prindle, Weber & Schmidt, 1981, Ch. 2.

[5] D. Skurnick, "The California Table L," *PCAS* LXI, 1974.

EXHIBIT 1

EXCESS PURE PREMIUMS

LOSSES VALUED AT 18 MONTHS EXPECTED LOSSES = $833,333			LOSSES VALUED AT 30 MONTHS EXPECTED LOSSES = $946,970		
LOSS AMOUNT	CUMULATIVE PROBABILITY	EXCESS PURE PREMIUM	LOSS AMOUNT	CUMULATIVE PROBABILITY	EXCESS PURE PREMIUM
$900,000	0.6508	$129,345	$900,000	0.5469	$196,000
910,000	0.6594	125,896	910,000	0.5561	191,516
920,000	0.6678	122,532	920,000	0.5653	187,123
930,000	0.6760	119,251	930,000	0.5742	182,820
940,000	0.6840	116,051	940,000	0.5831	178,607
950,000	0.6919	112,930	950,000	0.5918	174,481
960,000	0.6996	109,887	960,000	0.6003	170,442
970,000	0.7071	106,920	970,000	0.6088	166,487
980,000	0.7144	104,028	980,000	0.6170	162,616
990,000	0.7216	101,208	990,000	0.6252	158,827
1,000,000	0.7286	98,459	1,000,000	0.6332	155,119
1,010,000	0.7355	95,780	1,010,000	0.6410	151,490
1,020,000	0.7422	93,168	1,020,000	0.6487	147,939
1,030,000	0.7488	90,623	1,030,000	0.6563	144,464
1,040,000	0.7552	88,143	1,040,000	0.6638	141,064
1,050,000	0.7614	85,726	1,050,000	0.6711	137,739
1,060,000	0.7675	83,371	1,060,000	0.6782	134,485
1,070,000	0.7735	81,076	1,070,000	0.6853	131,303
1,080,000	0.7793	78,840	1,080,000	0.6922	128,190
1,090,000	0.7850	76,662	1,090,000	0.6989	125,145
1,100,000	0.7906	74,540	1,100,000	0.7056	122,168
1,110,000	0.7960	72,473	1,110,000	0.7121	119,256
1,120,000	0.8013	70,459	1,120,000	0.7185	116,409
1,130,000	0.8065	68,498	1,130,000	0.7247	113,625
1,140,000	0.8115	66,588	1,140,000	0.7309	110,903
1,150,000	0.8165	64,728	1,150,000	0.7369	108,241
1,160,000	0.8213	62,917	1,160,000	0.7427	105,639
1,170,000	0.8260	61,153	1,170,000	0.7485	103,095
1,180,000	0.8306	59,435	1,180,000	0.7542	100,609
1,190,000	0.8350	57,763	1,190,000	0.7597	98,178
1,200,000	0.8394	56,135	1,200,000	0.7651	95,802
1,210,000	0.8436	54,550	1,210,000	0.7704	93,479
1,220,000	0.8478	53,007	1,220,000	0.7756	91,209
1,230,000	0.8519	51,505	1,230,000	0.7807	88,991
1,240,000	0.8558	50,043	1,240,000	0.7857	86,823
1,250,000	0.8597	48,620	1,250,000	0.7906	84,704
1,260,000	0.8634	47,235	1,260,000	0.7954	82,634
1,270,000	0.8671	45,887	1,270,000	0.8001	80,611
1,280,000	0.8707	44,576	1,280,000	0.8046	78,635
1,290,000	0.8742	43,300	1,290,000	0.8091	76,703
1,300,000	0.8776	42,058	1,300,000	0.8135	74,816

EXHIBIT 1

EXCESS PURE PREMIUMS

LOSSES VALUED AT 42 MONTHS EXPECTED LOSSES = $975,610			LOSSES VALUED AT 54 MONTHS EXPECTED LOSSES = $986,193		
LOSS AMOUNT	CUMULATIVE PROBABILITY	EXCESS PURE PREMIUM	LOSS AMOUNT	CUMULATIVE PROBABILITY	EXCESS PURE PREMIUM
$900,000	0.5218	$214,600	$900,000	0.5127	$221,641
910,000	0.5311	209,865	910,000	0.5221	216,815
920,000	0.5403	205,223	920,000	0.5313	212,081
930,000	0.5494	200,672	930,000	0.5404	207,440
940,000	0.5584	196,210	940,000	0.5493	202,888
950,000	0.5672	191,838	950,000	0.5582	198,426
960,000	0.5759	187,553	960,000	0.5669	194,051
970,000	0.5844	183,355	970,000	0.5755	189,763
980,000	0.5928	179,241	980,000	0.5840	185,560
990,000	0.6011	175,211	990,000	0.5923	181,442
1,000,000	0.6093	171,263	1,000,000	0.6005	177,406
1,010,000	0.6173	167,396	1,010,000	0.6086	173,452
1,020,000	0.6252	163,608	1,020,000	0.6166	169,578
1,030,000	0.6330	159,899	1,030,000	0.6244	165,782
1,040,000	0.6406	156,267	1,040,000	0.6321	162,065
1,050,000	0.6481	152,711	1,050,000	0.6397	158,423
1,060,000	0.6555	149,229	1,060,000	0.6471	154,857
1,070,000	0.6627	145,820	1,070,000	0.6544	151,365
1,080,000	0.6698	142,483	1,080,000	0.6616	147,945
1,090,000	0.6768	139,216	1,090,000	0.6686	144,596
1,100,000	0.6837	136,019	1,100,000	0.6756	141,317
1,110,000	0.6904	132,889	1,110,000	0.6824	138,106
1,120,000	0.6970	129,826	1,120,000	0.6891	134,963
1,130,000	0.7035	126,829	1,130,000	0.6956	131,887
1,140,000	0.7099	123,895	1,140,000	0.7021	128,875
1,150,000	0.7161	121,025	1,150,000	0.7084	125,927
1,160,000	0.7222	118,216	1,160,000	0.7146	123,042
1,170,000	0.7282	115,468	1,170,000	0.7207	120,218
1,180,000	0.7341	112,779	1,180,000	0.7266	117,454
1,190,000	0.7399	110,149	1,190,000	0.7325	114,749
1,200,000	0.7455	107,576	1,200,000	0.7382	112,103
1,210,000	0.7511	105,058	1,210,000	0.7438	109,513
1,220,000	0.7565	102,596	1,220,000	0.7494	106,978
1,230,000	0.7618	100,188	1,230,000	0.7548	104,499
1,240,000	0.7670	97,832	1,240,000	0.7601	102,073
1,250,000	0.7722	95,528	1,250,000	0.7653	99,700
1,260,000	0.7772	93,274	1,260,000	0.7704	97,378
1,270,000	0.7821	91,070	1,270,000	0.7754	95,106
1,280,000	0.7869	88,915	1,280,000	0.7803	92,884
1,290,000	0.7916	86,808	1,290,000	0.7851	90,711
1,300,000	0.7962	84,747	1,300,000	0.7898	88,585

EXHIBIT 1

EXCESS PURE PREMIUMS

LOSSES VALUED AT 66 MONTHS EXPECTED LOSSES = $991,080			LOSSES VALUED AT 78 MONTHS EXPECTED LOSSES = $996,016		
LOSS AMOUNT	CUMULATIVE PROBABILITY	EXCESS PURE PREMIUM	LOSS AMOUNT	CUMULATIVE PROBABILITY	EXCESS PURE PREMIUM
$900,000	0.5086	$224,922	$900,000	0.5044	$228,254
910,000	0.5179	220,054	910,000	0.5137	223,345
920,000	0.5271	215,279	920,000	0.5229	218,528
930,000	0.5362	210,595	930,000	0.5320	213,803
940,000	0.5452	206,002	940,000	0.5410	209,168
950,000	0.5540	201,499	950,000	0.5499	204,622
960,000	0.5628	197,083	960,000	0.5586	200,165
970,000	0.5714	192,754	970,000	0.5673	195,795
980,000	0.5799	188,510	980,000	0.5758	191,510
990,000	0.5883	184,351	990,000	0.5842	187,310
1,000,000	0.5965	180,275	1,000,000	0.5924	183,193
1,010,000	0.6046	176,280	1,010,000	0.6006	179,158
1,020,000	0.6126	172,366	1,020,000	0.6086	175,203
1,030,000	0.6204	168,531	1,030,000	0.6164	171,328
1,040,000	0.6282	164,774	1,040,000	0.6242	167,532
1,050,000	0.6358	161,094	1,050,000	0.6318	163,812
1,060,000	0.6432	157,489	1,060,000	0.6393	160,167
1,070,000	0.6506	153,957	1,070,000	0.6467	156,597
1,080,000	0.6578	150,499	1,080,000	0.6539	153,100
1,090,000	0.6649	147,112	1,090,000	0.6611	149,675
1,100,000	0.6718	143,796	1,100,000	0.6681	146,321
1,110,000	0.6787	140,548	1,110,000	0.6749	143,036
1,120,000	0.6854	137,368	1,120,000	0.6817	139,818
1,130,000	0.6920	134,255	1,130,000	0.6883	136,668
1,140,000	0.6985	131,207	1,140,000	0.6948	133,584
1,150,000	0.7048	128,223	1,150,000	0.7012	130,564
1,160,000	0.7110	125,302	1,160,000	0.7075	127,607
1,170,000	0.7172	122,443	1,170,000	0.7136	124,712
1,180,000	0.7232	119,645	1,180,000	0.7197	121,879
1,190,000	0.7291	116,906	1,190,000	0.7256	119,105
1,200,000	0.7348	114,225	1,200,000	0.7314	116,390
1,210,000	0.7405	111,601	1,210,000	0.7371	113,732
1,220,000	0.7460	109,034	1,220,000	0.7427	111,131
1,230,000	0.7515	106,522	1,230,000	0.7482	108,585
1,240,000	0.7568	104,063	1,240,000	0.7536	106,094
1,250,000	0.7621	101,658	1,250,000	0.7588	103,656
1,260,000	0.7672	99,304	1,260,000	0.7640	101,270
1,270,000	0.7723	97,001	1,270,000	0.7691	98,936
1,280,000	0.7772	94,748	1,280,000	0.7741	96,651
1,290,000	0.7820	92,544	1,290,000	0.7789	94,416
1,300,000	0.7868	90,388	1,300,000	0.7837	92,229

EXHIBIT 1

EXCESS PURE PREMIUMS

LOSSES VALUED AT 90 MONTHS
EXPECTED LOSSES = $1,000,000

LOSS AMOUNT	CUMULATIVE PROBABILITY	EXCESS PURE PREMIUM
$900,000	0.5010	$230,957
910,000	0.5103	226,014
920,000	0.5195	221,163
930,000	0.5287	216,405
940,000	0.5377	211,736
950,000	0.5465	207,157
960,000	0.5553	202,667
970,000	0.5640	198,263
980,000	0.5725	193,945
990,000	0.5809	189,712
1,000,000	0.5892	185,562
1,010,000	0.5973	181,494
1,020,000	0.6053	177,508
1,030,000	0.6132	173,600
1,040,000	0.6210	169,771
1,050,000	0.6286	166,020
1,060,000	0.6362	162,344
1,070,000	0.6436	158,742
1,080,000	0.6508	155,214
1,090,000	0.6580	151,758
1,100,000	0.6650	148,373
1,110,000	0.6719	145,057
1,120,000	0.6787	141,810
1,130,000	0.6853	138,630
1,140,000	0.6919	135,516
1,150,000	0.6983	132,467
1,160,000	0.7046	129,481
1,170,000	0.7108	126,558
1,180,000	0.7168	123,696
1,190,000	0.7228	120,894
1,200,000	0.7286	118,151
1,210,000	0.7344	115,466
1,220,000	0.7400	112,837
1,230,000	0.7455	110,265
1,240,000	0.7509	107,747
1,250,000	0.7562	105,283
1,260,000	0.7614	102,871
1,270,000	0.7665	100,511
1,280,000	0.7715	98,201
1,290,000	0.7765	95,941
1,300,000	0.7813	93,729