

SOLVENCY MARGINS AND THE UNDERWRITING CYCLE

1. Introduction

1.1 Work on the effect of the underwriting cycle and solvency appear to have been minimal in the past. The general view of these cycles has been:-

- (1) They are due to the market charging incorrect premium rates due to pressure from competitors.
- (2) They are due to trends not picked up the underwriter.
- (3) They are due to fluctuations in the claims experience (Cyclic or random).
- (4) They are due to the methods of reserving in the accounts so that steady profits emerge even through underwriting profits may fluctuate.
- (5) They are a function of how near the General Manager/Underwriter is to retirement!

1.2 It is clear that from all of these factors, there is little to link underwriting cycles with solvency, except, perhaps, the first. What this note intends to show is that there is an underwriting cycle of specific form closely linked with the solvency of the Company, and this is effected by competition, and the fact that solvency margins are related to premiums, which in themselves, may be inadequate.

2. The Underwriting Cycle

2.1 There are three important questions to ask about the underwriting cycle. These are:-

- (1) Does it actually exist?
- (2) Does it have a mathematical (predictable) formulation?
- (3) How is it explained?

2.2 Actuarial (and non-actuarial) literature seems to advocate existence. However, to analyse this, and to derive a mathematical formulation would involve Box-Jenkins type analysis on data that may, even in its best form, be of a dubious quality since the effects of accounting practice and assessments of reserves (provisions) may, in themselves, be altered to achieve the right level of results for profits and taxation. This leaves the third question, and this is probably the most important question if one is trying to determine the effect on solvency.

2.3 The most general view is that underwriting cycles occur because of the variation in underwriting capacity. The general principles behind this view are as follows:-

- (1) Underwriting capacity is high and therefore insurance companies are chasing too little business.
- (2) As a result premium rates per unit of risk decrease and poor underwriting results occur.

(3) As a result of these poor underwriting results the solvency margin decreases, and the capacity to write business is curtailed.

(4) Since the underwriting capacity is smaller, fewer companies are chasing the same type of business as in (1) above. As a result, premiums increase, which result in improvements to the underwriting profits and hence solvency. Eventually underwriting capacity is high, and we start at (1) again.

2.4 Thus the theory relates to underwriting capacity, which one can relate to free reserves because an insurer cannot write more business than a "fixed" multiple of these reserves because he would have problems in meeting the solvency margins. I have ignored the claims reserve multiple in assessing the solvency margins as this should only apply to closed funds, decreasing funds or companies with a low net retention. The basic problem in this approach is that insurers do not "go out of the market", but try to write as much business as possible on "profitable" terms. The number of units at risk is often increasing due to inflation, in that a house worth £30,000 5 years old has doubled its units to a value of £60,000.

2.5 The other problem was that high solvency should produce low underwriting results, and vice versa with little time delay in the correction of these results. The problem was investigated by setting up a theoretical model which was designed to look at the underwriting cycles if premiums were geared to the solvency margin. This model ignorestrends in claim rates, and also implies that the market is fully aware of the adequacy of the premiums in relation to claims. It also does not assume that offices change their market position in that the portfolio available was fixed in risk size, and the risk the unit element would only increase with inflation.

3. The Underwriting Cycle Model

3.1 There are a number of parameters required plus some definitions:-

Definitions

- (1) Solvency level = Free Reserves/Premiums Paid in financial year
- (2) Underwriting loss ratio = $\frac{\text{Claims paid (plus expenses)}}{\text{Premiums received}}$

Assumptions

- (1) All claims are paid immediately (or in the same financial year as premiums are received) or the outstanding claims are reserved for immediately.
- (2) Tax is assumed at 52% of total profits

Parameters

- I = Current solvency level
- $M(N)$ = Solvency level at end of year $N-1$
- $M(1)$ = I
- $S1$ = Minimum solvency margin
- $S2$ = Maximum underwriting loss ratio
- $S3$ = Minimum underwriting loss ratio (i.e. maximum underwriting profit)
- P = Current level of premiums
- $P(N)$ = Level of premiums in year N
- $P(1)$ = P
- $U(N)$ = Amount of tax relief carried forward
- $U(1)$ = U
- R = Rate of interest
- J = Rate of inflation
- K = Desired level of solvency

$$C(N) = \text{Claims during year } N$$

$$= 100 \times (1+j)^{N-1/2}$$

$$F(K, M(N)) = \text{Adjustment function for level of premiums based on desired level of solvency, and actual level of solvency.}$$

$$S(N) = \text{Fund at beginning of financial period } N$$

$$S(1) = I \times P$$

$$T(N) = \text{Tax in year}$$

$$R(N) = \text{Underwriting profit} = P(N) - C(N)$$

Method of Calculation

3.2

- (1) Premium in year $N = P(N)$
$$= F(K, M(N)) \times P(N-1) \times (1+J)$$
- (2) Claims for year $N = C(N)$
- (3) Check $P(N)$ is greater than $S_2 \times C(N)$ (i.e. satisfies a maximum underwriting loss).
- (4) Check that $P(N)$ satisfies a minimum solvency level
i.e. $P(N) > (C(N) - S(N)) / (1 - S_1)$
If not then $P(N) = \frac{2 \times (C(N) - S(N))}{(2 - S_1 - K)}$
- (5) Check that $P(N) < S_3 \times C(N)$ (maximum underwriting profit)
- (6) Define $I(N)$ = Interest in year
$$= S(N) \times R + P(N) \times \frac{R}{2} - C(N) \times \frac{R}{2}$$
- (7) Define $S(N+1) = S(N) + P(N) + I(N) - C(N)$
- (8) Calculate $T(N) = .52 \times (S(N+1) - S(N) - U)$
If $T(N) < 0$; $U = 0 - T(N) / .52$
$$T(N) = 0$$
- (9) $S(N+1) = S(N+1) - T(N)$
- (10) $M(N+1) = S(N+1) / P(N)$
- (11) $R(N) = P(N) - C(N)$

The function of determining the premiums with reference to solvency was as follows:-

$$F(K, M(N)) = \text{SQR} \left(\frac{1+K}{1+M(N)} \right)$$

Function of the form $G \left(\frac{1+K}{1+M(N)} \right)$

exhibited underwriting cycles provided G is as follows

$$G(x) = \sum_{t=1}^p x^{\Gamma_t}$$

$$\Gamma_t < 1 \text{ for all } t$$

3.5 A detailed print out of the programme used is appended to this note, together with the results of a series of calculations. These appear in batches of three namely:-

- (i) with zero interest and inflation.
- (ii) with interest at 12% per annum and inflation at 10% per annum.
- (iii) with interest at 10% per annum and inflation at 12% per annum.

The series of runs are based on the following types of offices

- (1) Runs 1 - 3 An office wishing to maintain a solvency margin between 30% and 40%, but with a solvency margin at the higher end. It is quite happy to make a large underwriting profit, but not a loss.
- (2) Runs 4 - 6 As the first office, except it is more willing to make a loss.
- (3) Runs 7 - 9 An office with a higher degree of solvency and desired solvency, which is currently willing to cut its large solvency margins.

- (4) Runs 10 - 12 A nearly insolvent office.

- (5) Runs 13 - 14 As runs 10 - 12 above, but only looks at the
 situation if he actually is bankrupt, (i.e. looking at a
 zero solvency margin).

- (6) Runs 16 - 18 As runs 7 - 9, but again with a zero solvency
 margin.

4. Comments

4.1 It should be noted that certain assumptions are made in this model; that is:-

Condition 1: The premiums charged per unit of risk relate to the solvency margin at the previous years end, but aim for a desired level of solvency.

Condition 2: The premiums should not be less than the maximum underwriting loss acceptable to the insurer.

Condition 3: The premiums should be such that the minimum solvency margin should be satisfied. If it wasn't, then the aim should be half way between the minimum level of solvency and the desired level of solvency.

Condition 4: The premiums should not be so large as to generate unacceptable profits.

4.2 Besides Condition 1, which is a basic desire for solvency, Condition 2 was found to be essential for solvency (and good commercial judgement). Condition 4 was placed in for commercial judgement, otherwise premiums became too high.

4.3 Condition 3, which is a minimum solvency type condition, was found to be essential. Without this condition all models went into technical insolvency rapidly, and some even went into negative insolvency. Thus to remain solvent the company is forced to write business on premiums which reflect the solvency position.

4.4 It should be noted that all the results exhibited underwriting cycles of various terms, which depended on interest rate and inflation. The office knows its expected claims level, and no cycle or trend of claims was introduced in the model. Thus, an underwriting cycle can be shown to be a natural consequences of writing business with reference to a solvency margin.

4.5 The reason why this cycle should exist is apparent from looking at the examples. First the definition of solvency is related to premiums. The claims ratio rarely operates (and, in our model, it will not operate). If premiums decrease, then the solvency margin may increase. There is thus an in-built delay before the solvency margin reflects this underwriting philosophy of the office. Similarly, when premiums increase, the solvency margin may decrease. This indicates, at least for companies with a minimum acceptable solvency margin, that the measure of solvency with respect to premiums may be inadequate for solvency purposes. What is clear is that the underwriting cycle gives an early warning of possible inadequacies of the company, or improvements to a company when the solvency margin is actually being eroded. The actual delay in this may be as much as $2\frac{1}{2}$ years, in practice.

5. Conclusion

5.1 What is clear from the above is that:-

- (i) The current definition of solvency margin is an inadequate measure of actual solvency in relation to business being written.
- (ii) An earlier warning of possible insolvency is the level of underwriting profits, and the trend in the underwriting cycle
- (iii) In the model, a desired level of solvency was not achieved in the long run.

Thus underwriting cycles lead solvency margin cycles rather than follow that as suggested by the theoretical model from 2.3.

5.2 Further work should be done in this area to see if a degree of solvency formula could be achieved with reference to an underwriting cycle. In practice, this may be difficult because the actual companies accounts, on which such cycles are based, may be adjusted by hidden reserves so their results are not as bad or as good as they appear to be.

5.3 The model produced is a simple one, and, as such, cannot hope to reflect the actual-occurrence in a typical office. However, it clearly illustrates a strong connection between solvency margins and underwriting cycles and suggests that the latter gives an earlier warning of insolvencies than do the traditional measures.

```

10 DEFINT N
20 DEFSNG I,P,M,S,C,J,R,K,T,U
30 DIM P(51),M(51),S(51),C(51),I(51),R(51),T(51)
40 PRINT "THIS IS A PROGRAM TO TEST THE CYCLIC UNDERWRITING MODEL"
50 PRINT "WHAT IS THE CURRENT SOLVENCY LEVEL"
60 INPUT I
61 PRINT "WHAT IS THE MINIMUM SOLVENCY LEVEL REQUIRED ?"
62 INPUT S1
63 PRINT "WHAT IS THE MAXIMUM UNDERWRITING LOSS REQUIRED ?"
64 INPUT S2
65 S3=1-S1
66 PRINT "WHAT IS THE MINIMUM UNDERWRITING LOSS ?"
67 INPUT S4
70 PRINT "WHAT IS THE CURRENT LEVEL OF PREMIUMS"
80 INPUT P
90 P(1) = P
91 PRINT "WHAT IS THE RATE OF TAX RELEIF CARRIED FORWARD ?"
92 INPUT U1
93 U = U1
100 PRINT "WHAT IS THE DESIRED LEVEL OF SOLVENCY"
110 INPUT K
112 PRINT "WHAT IS THE RATE OF INTEREST %"
113 INPUT R1
114 R=R1/100
115 PRINT "WHAT IS THE RATE OF INFLATION"
116 INPUT J1
117 J=J1/100
118 Q=100
120 S(1)=I*P
130 M(1) =I
140 FOR N = 2 TO 51
150 P(N) = P(N-1)* SQR((1+K)/(1+M(N-1)))*(1+J)
160 C(N)=Q*(1+J)^(N-1.5)
161 IF P(N) > S2*C(N) GOTO 163
162 P(N) = S2*C(N)
163 IF S3*P(N)>(C(N)-S(N-1)) GOTO 165
164 P(N)=2*(C(N)-S(N-1))/(S3+1-K)
165 IF P(N)<S4*C(N) GOTO 170
166 P(N)=S4*C(N)
170 I(N)=S(N-1)*R+P(N)*R-C(N)*R/2
180 S(N)=S(N-1)+P(N)+I(N)-C(N)
182 T(N) = .52*(S(N)-S(N-1)-U)
183 IF T(N)>0 GOTO 187
184 U = 0-T(N)/.52
185 T(N) = 0
186 GOTO 190
187 S(N) = S(N) - T(N)
188 U= 0
190 M(N)=S(N)/P(N)
200 R(N)=P(N)-C(N)
210 NEXT
215 LPRINT CHR$(12)
220 LPRINT "SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE"
230 LPRINT "INITIAL SOLVENCY LEVEL",I
240 LPRINT "INITIAL PREMIUM LEVEL",P
250 LPRINT "DESIRED LEVEL OF SOLVENCY",K
255 LPRINT "MINIMUM SOLVENCY LEVEL",S1
256 LPRINT "MAXIMUM UNDERWRITING LOSS",S2
257 LPRINT "MINIMUM UNDERWRITING LOSS",S4
260 LPRINT "RATE OF INTEREST",R
270 LPRINT "RATE OF INFLATION",J
280 LPRINT "RATE OF UNUSED TAX AT BEGINNING",U1

```

```
285 GOTO 370
290 LPRINT S(1),S(2),S(3),S(4),S(5),S(6),S(7),S(8),S(9)
300 LPRINT P(2),P(3),P(4),P(5),P(6),P(7),P(8),P(9),P(10)
310 LPRINT I(2),I(3),I(4),I(5),I(6),I(7),I(8),I(9),I(10)
320 LPRINT C(2),C(3),C(4),C(5),C(6),C(7),C(8),C(9),C(10)
330 LPRINT T(2),T(3),T(4),T(5),T(6),T(7),T(8),T(9),T(10)
340 LPRINT S(2),S(3),S(4),S(5),S(6),S(7),S(8),S(9),S(10)
350 LPRINT
360 LPRINT M(2),M(3),M(4),M(5),M(6),M(7),M(8),M(9),M(10)
370 LPRINT
371 LPRINT "YEAR","FUND AT","PREMIUMS","SOLVENCY","UNDERWRITING"
372 LPRINT "      ","      END      ","      ","      MARGIN ","      PROFIT      "
373 LPRINT
374 GOTO 390
380 LPRINT R(2),R(3),R(4),R(5),R(6),R(7),R(8),R(9),R(10)
390 FOR N = 2 TO 41
400 LPRINT N-1,S(N),P(N),M(N),R(N)
410 NEXT
420 END
```

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .4
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .35
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.1
 RATE OF INTEREST 0
 RATE OF INFLATION 0
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	38.1981	98.1981	.38899	-1.80194
2	35.0081	96.81	.361616	-3.18999
3	31.4043	96.3962	.325783	-3.60382
4	33.0276	101.623	.325	1.62333
5	35.6051	102.578	.347105	2.57755
6	38.2929	102.688	.372906	2.68774
7	40.0578	101.827	.393389	1.82749
8	40.168	100.23	.40076	.229561
9	38.5648	98.3968	.391931	-1.60321
10	35.4682	96.9034	.366016	-3.09661
11	31.8018	96.3337	.330121	-3.66635
12	32.8362	101.034	.325	1.03436
13	34.8192	101.983	.341422	1.98305
14	37.1278	102.309	.3629	2.30862
15	38.9511	101.823	.382537	1.82328
16	39.5691	100.618	.393261	.618004
17	38.6127	99.0436	.389856	-.956421
18	36.2259	97.6132	.371117	-2.38684
19	33.0845	96.8586	.341575	-3.14143
20	30.2467	97.1622	.311301	-2.83777
21	33.5849	103.338	.325	3.33823
22	37.8935	104.309	.363283	4.30856
23	40.8998	103.799	.394028	3.79917
24	41.9303	102.147	.410491	2.14685
25	41.8628	99.9325	.418911	-.0674896
26	39.3385	97.4757	.403572	-2.52435
27	34.9358	95.5973	.365447	-4.4027
28	29.9908	95.055	.31551	-4.94498
29	33.7081	103.717	.325	3.71733
30	38.3993	104.691	.366787	4.69121
31	42.1777	104.046	.405374	4.04632
32	43.1261	101.976	.422905	1.97592
33	42.4552	99.3291	.42742	-.670883
34	39.0531	96.5979	.404286	-3.40212
35	34.0531	95	.358454	-5
36	29.0531	95	.305822	-5
37	34.1596	105.106	.325	5.10647
38	40.253	106.093	.379411	6.09339
39	44.126	104.956	.420423	4.95627
40	45.2403	102.321	.442139	2.32139

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .4
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .35
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.1
 RATE OF INTEREST .12
 RATE OF INFLATION .1
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	47.011	108.018	.435215	3.13699
2	52.9712	115.238	.459667	-.130722
3	56.99	121.907	.467486	-4.99867
4	60.5406	132.617	.456508	-6.97983
5	64.3226	145.878	.440933	-7.67781
6	68.3519	160.466	.425958	-8.44559
7	72.6457	176.513	.411561	-9.29015
8	77.2225	194.164	.397718	-10.2192
9	82.1022	213.58	.384409	-11.2411
10	92.5769	244.743	.378262	-2.5607
11	102.738	266.443	.385592	-5.59128
12	111.931	289.298	.386904	-9.93912
13	119.689	313.966	.381215	-15.1953
14	135.407	359.094	.377079	-2.98294
15	150.815	391.101	.385616	-7.1842
16	164.879	424.646	.388274	-13.4677
17	176.805	460.626	.383837	-21.2985
18	198.659	523.425	.379537	-6.69238
19	219.607	569.57	.385566	-13.5587
20	238.361	618.434	.385426	-23.0078
21	254.099	671.524	.378392	-34.0623
22	289.613	773.401	.374467	-2.74384
23	325.171	843.135	.38567	-10.6243
24	358.207	915.434	.391297	-23.7015
25	386.48	991.92	.389629	-41.1287
26	410.923	1079.54	.380648	-56.8176
27	466.867	1243.06	.375579	-6.92896
28	522.394	1354.59	.385647	-20.3948
29	573.612	1470.76	.39001	-41.7253
30	617.284	1594.38	.387162	-69.3514
31	656.354	1738.6	.377518	-91.5054
32	750.473	2010.02	.373365	-3.09619
33	845.49	2192.14	.385692	-22.2949
34	934.355	2380.09	.392571	-55.7825
35	1010.67	2577.77	.392073	-101.689
36	1074.55	2800.04	.383762	-147.37
37	1213.21	3211.26	.377799	-30.8887
38	1348.28	3496.57	.385601	-69.793
39	1470.92	3796.49	.387441	-126.506
40	1574.61	4119.41	.382242	-195.89

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .4
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .35
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.1
 RATE OF INTEREST .1
 RATE OF INFLATION .12
 RATE OF UNUSED TAX AT BEGINNING

0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	46.6521	109.982	.42418	4.15178
2	52.4748	119.929	.43755	1.39915
3	56.8136	130.166	.436471	-2.58739
4	59.2262	141.33	.419064	-7.35384
5	61.6694	158.199	.389821	-8.32628
6	68.2812	184.947	.369193	-1.56162
7	74.8793	205.684	.364051	-3.20596
8	81.5645	229.176	.355903	-4.78017
9	94.5809	267.358	.353762	5.32675
10	109.094	299.025	.364834	5.54971
11	124.538	333.082	.373895	4.39069
12	140.227	369.794	.379203	1.65927
13	155.507	409.761	.379507	-2.54977
14	169.941	453.998	.374321	-7.79034
15	183.518	503.958	.364153	-13.2445
16	209.94	586.294	.358079	7.02765
17	238.711	654.694	.364614	5.91473
18	269.027	729.32	.368874	2.68756
19	300.078	811.187	.369924	-2.64044
20	331.295	901.899	.36733	-9.58826
21	362.637	1003.7	.361298	-17.1608
22	394.868	1119.47	.352726	-23.8944
23	461.231	1312.16	.351506	31.5826
24	536.036	1468.8	.36495	34.5537
25	615.983	1636.02	.376513	29.6665
26	696.909	1814.61	.384055	15.4938
27	774.6	2007.2	.38591	-7.80542
28	845.849	2218.75	.381228	-38.0576
29	909.691	2456.75	.370283	-70.8762
30	1029.41	2846.29	.361665	15.3547
31	1156.77	3174.16	.364432	3.51343
32	1289.64	3536.21	.364696	-14.9167
33	1426.89	3939.17	.362231	-38.0891
34	1569.28	4392.02	.357303	-62.5088
35	1720.39	4905.82	.350683	-83.2607
36	2011.88	5729.45	.351147	141.686
37	2341	6414.26	.364968	155.964
38	2692.97	7144.48	.37693	135.184
39	3049.06	7923.18	.384828	72.7661
40	3390.17	8761.66	.386933	-30.7998

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .4
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .35
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .9
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST 0
 RATE OF INFLATION 0
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	38.1981	98.1981	.38899	-1.80194
2	35.0081	96.81	.361616	-3.18999
3	31.4043	96.3962	.325783	-3.60382
4	33.0276	101.623	.325	1.62333
5	35.6051	102.578	.347105	2.57755
6	38.2929	102.688	.372906	2.68774
7	40.0578	101.827	.393389	1.82749
8	40.168	100.23	.40076	.229561
9	38.5648	98.3968	.391931	-1.60321
10	35.4682	96.9034	.366016	-3.09661
11	31.8018	96.3337	.330121	-3.66635
12	32.8362	101.034	.325	1.03436
13	34.8192	101.983	.341422	1.98305
14	37.1278	102.309	.3629	2.30862
15	38.9511	101.823	.382537	1.82328
16	39.5691	100.618	.393261	.618004
17	38.6127	99.0436	.389856	-.956421
18	36.2259	97.6132	.371117	-2.38684
19	33.0845	96.8586	.341575	-3.14143
20	30.2467	97.1622	.311301	-2.83777
21	33.5849	103.338	.325	3.33823
22	37.8935	104.309	.363283	4.30856
23	40.8998	103.799	.394028	3.79917
24	41.9303	102.147	.410491	2.14685
25	41.8628	99.9325	.418911	-.0674896
26	39.3385	97.4757	.403572	-2.52435
27	34.9358	95.5973	.365447	-4.4027
28	29.9908	95.055	.31551	-4.94498
29	33.7081	103.717	.325	3.71733
30	38.3993	104.691	.366787	4.69121
31	42.1777	104.046	.405374	4.04632
32	43.1261	101.976	.422905	1.97592
33	42.4552	99.3291	.42742	-.670883
34	39.0531	96.5979	.404286	-3.40212
35	33.7655	94.7124	.356506	-5.28762
36	31.8907	98.1252	.325	-1.87484
37	30.9372	99.0465	.31235	-.953468
38	31.3945	100.457	.312516	.457237
39	33.2761	101.882	.326615	1.88162
40	36.0517	102.776	.350781	2.77564

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .4
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .35
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .9
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .12
 RATE OF INFLATION .1
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	47.011	108.018	.435215	3.13699
2	52.9712	115.238	.459667	-.130722
3	56.99	121.907	.467486	-4.99867
4	58.391	128.618	.453987	-10.9784
5	57.413	138.2	.415433	-15.3556
6	64.0888	165.183	.387986	-3.72841
7	69.5807	179.198	.388289	-6.60486
8	74.0973	194.381	.381197	-10.0026
9	84.0196	223.295	.376272	-1.52646
10	93.8124	243.269	.385633	-4.03474
11	102.803	264.133	.389209	-7.90134
12	110.45	286.416	.385626	-12.821
13	123.526	324.017	.381233	-5.14426
14	135.848	352.366	.385531	-9.71143
15	146.711	382.6	.383459	-15.6848
16	164.335	431.707	.380664	-6.40665
17	181.041	469.574	.385543	-12.3504
18	195.848	509.864	.384118	-20.2535
19	208.207	553.895	.375896	-29.2344
20	238.881	641.83	.372188	.388245
21	270.11	700.282	.385717	-5.3042
22	299.513	760.318	.393932	-15.8267
23	324.852	823.065	.394686	-30.6943
24	344.599	890.749	.386864	-48.3859
25	387.144	1019.93	.379581	-13.1229
26	427.909	1109.82	.385565	-26.5286
27	464.391	1205.04	.385375	-44.9508
28	495	1308.51	.378294	-66.4788
29	564.33	1507.39	.374377	-5.09998
30	633.795	1643.35	.385672	-20.3799
31	698.367	1784.27	.391402	-45.8375
32	753.647	1933.28	.389829	-79.8422
33	797.117	2095.91	.38032	-118.52
34	908.837	2427.79	.374348	-8.08569
35	1020.8	2646.81	.385672	-32.656
36	1124.89	2873.77	.391435	-73.6409
37	1214.02	3113.72	.389893	-128.428
38	1284.09	3375.58	.380406	-190.781
39	1463.78	3909.49	.374416	-13.5081
40	1643.76	4262.07	.385671	-53.2285

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .4
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .35
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .9
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .1
 RATE OF INFLATION .12
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	46.6521	109.982	.42418	4.15178
2	52.4748	119.929	.43755	1.39915
3	56.8136	130.166	.436471	-2.58739
4	59.2262	141.33	.419064	-7.35384
5	59.6578	154.389	.386411	-12.1362
6	67.7466	187.927	.360494	1.41859
7	76.4212	209.665	.364492	.775559
8	85.5029	233.575	.366062	-.381638
9	94.8557	260.061	.364744	-1.96991
10	104.454	289.691	.360571	-3.78387
11	114.452	323.191	.354132	-5.50086
12	132.842	375.826	.353467	7.69119
13	153.377	420.386	.364849	8.07474
14	175.242	468.263	.374237	6.47546
15	197.443	519.81	.379836	2.60712
16	219.022	575.858	.380341	-3.40857
17	239.327	637.833	.375219	-10.9454
18	258.307	707.793	.364947	-18.8393
19	295.077	822.994	.358541	9.16638
20	335.005	918.852	.364591	7.36438
21	377.028	1023.6	.368337	2.73138
22	420.112	1138.72	.368933	-4.64771
23	463.59	1266.52	.366035	-14.0558
24	507.544	1410.15	.359922	-24.0922
25	553.164	1573.6	.351528	-32.755
26	647.572	1845.85	.350826	46.7384
27	754.322	2066.72	.364985	51.7158
28	868.548	2301.99	.377303	45.1819
29	984.06	2552.54	.385521	24.9209
30	1094.5	2821.97	.38785	-8.97314
31	1194.91	3117.2	.383328	-53.4461
32	1283.55	3448.96	.372155	-102.173
33	1447.7	3990.69	.36277	13.4268
34	1620.96	4448.58	.364376	-5.95068
35	1801.09	4956.09	.363409	-32.9824
36	1987.69	5523.46	.359864	-64.3032
37	2183.41	6163.8	.354231	-94.4946
38	2530.44	7149.45	.353935	140.163
39	2917.05	7995.74	.364825	145.334
40	3328.28	8906.46	.373693	114.007

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .6
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST 0
 RATE OF INFLATION 0
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	55	95	.578947	-5
2	50	95	.526316	-5
3	45	95	.473684	-5
4	40	95	.421053	-5
5	35	95	.368421	-5
6	31.0899	96.0899	.32355	-3.9101
7	29.916	98.8261	.302714	-1.17393
8	32.3658	102.45	.315918	2.4498
9	37.3658	105	.355865	4.99999
10	42.3658	105	.403484	4.99999
11	47.2354	104.87	.45042	4.8696
12	50.2661	103.031	.487875	3.03072
13	50.208	99.9419	.502372	-.0581131
14	46.6848	96.4768	.483897	-3.52321
15	41.6848	95	.438787	-5
16	36.6848	95	.386156	-5
17	32.158	95.4732	.336828	-4.52676
18	29.861	97.703	.305631	-2.297
19	31.0334	101.172	.306738	1.17234
20	35.7538	104.72	.341422	4.72047
21	40.7538	105	.388132	4.99999
22	45.7538	105	.435751	4.99999
23	49.4383	103.684	.476815	3.68448
24	50.3903	100.952	.499151	.95195
25	47.9468	97.5565	.491477	-2.44354
26	42.9468	95	.452071	-5
27	37.9468	95	.39944	-5
28	32.9658	95.019	.346939	-4.98099
29	29.8383	96.8725	.308016	-3.12748
30	34.8383	105	.331793	4.99999
31	39.8383	105	.379412	4.99999
32	44.8383	105	.427031	4.99999
33	48.8391	104.001	.469603	4.00076
34	50.3471	101.508	.495991	1.50807
35	48.5445	98.1974	.494357	-1.80258
36	43.5912	95.0467	.45863	-4.95332
37	38.5912	95	.406223	-5
38	33.5912	95	.353592	-5
39	30.2061	96.6148	.312644	-3.38519
40	29.9839	99.7779	.300507	-.22213

SOLVENCY MARGIN CALCULATION AND UNDERWRITING CYCLE

INITIAL SOLVENCY LEVEL .6
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .12
 RATE OF INFLATION .1
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	65.4093	102.896	.635686	-1.9853
2	69.3984	109.601	.633194	-5.76845
3	73.6394	120.561	.610808	-6.34529
4	78.1491	132.617	.589286	-6.97983
5	82.9453	145.878	.568592	-7.67781
6	88.0472	160.466	.548697	-8.44559
7	93.4755	176.513	.529568	-9.29015
8	99.2521	194.164	.511177	-10.2192
9	105.401	213.58	.493494	-11.2411
10	111.947	234.938	.476493	-12.3652
11	118.917	258.432	.460148	-13.6017
12	126.341	284.276	.444432	-14.9619
13	134.25	312.703	.429322	-16.4581
14	142.678	343.973	.414795	-18.1039
15	151.661	378.371	.400827	-19.9142
16	161.238	416.208	.387398	-21.9057
17	172.566	459.903	.375223	-22.0218
18	208.505	550.079	.379045	19.9614
19	251.575	609.666	.412644	26.5375
20	298.615	667.625	.44728	26.1833
21	345.118	722.292	.477809	16.7065
22	385.833	773.323	.498928	-2.82208
23	415.627	822.104	.505565	-31.6548
24	441.37	892.178	.494711	-46.9568
25	468.777	981.396	.477663	-51.6524
26	497.96	1079.54	.461273	-56.8176
27	529.043	1187.49	.445514	-62.4994
28	562.156	1306.24	.430362	-68.7494
29	597.44	1436.86	.415795	-75.6243
30	635.047	1580.55	.401789	-83.1868
31	675.139	1738.6	.388323	-91.5054
32	722.207	1920.49	.376054	-92.63
33	871.288	2295.73	.379526	81.2979
34	1049.74	2543.97	.412638	108.098
35	1244.55	2785.82	.446746	106.362
36	1437.19	3014.49	.476761	67.0859
37	1606.07	3228.61	.497449	-13.5354
38	1730.12	3433.97	.503825	-132.391
39	1837.31	3726.85	.492992	-196.15
40	1951.42	4099.53	.47601	-215.765

SOLVENCY MARGIN CALCULATION AND UNDERWRITING CYCLE

INITIAL SOLVENCY LEVEL .6
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .1
 RATE OF INFLATION .12
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	64.8583	104.766	.619076	-1.06364
2	67.6871	112.603	.601112	-5.92648
3	70.6174	126.116	.559942	-6.63767
4	73.6502	141.249	.52142	-7.43417
5	76.7858	158.199	.485374	-8.32628
6	80.0239	177.183	.451645	-9.32544
7	83.3637	198.445	.420084	-10.4445
8	86.8037	222.259	.390553	-11.6978
9	101.245	269.581	.375565	7.54956
10	119.023	304.6	.39075	11.1254
11	139.801	342.285	.408436	13.593
12	162.778	382.209	.425888	14.0745
13	186.749	424.17	.440269	11.8597
14	210.278	468.383	.448945	6.59451
15	231.965	515.652	.449849	-1.55042
16	250.797	567.515	.441922	-11.7514
17	266.542	626.309	.425577	-22.4697
18	280.151	695.145	.40301	-31.4871
19	294.068	777.727	.378113	-36.1009
20	350.328	949.875	.368815	38.3878
21	418.596	1071.91	.390514	51.0433
22	496.314	1200.54	.41341	57.1685
23	581.302	1338.21	.434388	57.635
24	668.166	1480.72	.451245	46.4764
25	750.676	1628.86	.460859	22.5107
26	822.921	1785.92	.460783	-13.1931
27	880.774	1958.17	.449794	-56.8323
28	923.547	2155.16	.428528	-101.643
29	961.811	2401.24	.400547	-126.381
30	1001.18	2689.39	.372272	-141.547
31	1209.04	3329.18	.363165	158.532
32	1446.05	3728.68	.387818	177.556
33	1715.92	4176.13	.410887	198.863
34	2013.24	4659.18	.432103	204.646
35	2319.58	5159.46	.449578	170.386
36	2613.16	5678.92	.46015	91.1523
37	2872.79	6228	.46127	-30.292
38	3082.96	6827.56	.451546	-181.728
39	3239.54	7509.87	.431372	-340.54
40	3373.94	8352.83	.403928	-439.623

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .31
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST 0
 RATE OF INFLATION 0
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	32.6215	103.378	.315555	3.37804
2	35.0215	105	.333538	4.99999
3	37.4215	105	.356395	4.99999
4	39.8215	105	.379252	4.99999
5	42.2215	105	.402109	4.99999
6	44.5835	104.921	.424925	4.921
7	46.5032	103.999	.447149	3.99931
8	47.6029	102.291	.465367	2.2911
9	47.5865	99.9836	.475943	-.0164261
10	44.9638	97.3773	.461748	-2.62267
11	40.2622	95.2984	.422486	-4.70161
12	35.2622	95	.371181	-5
13	31.2554	95.9931	.3256	-4.00687
14	29.9056	98.6502	.303147	-1.34981
15	32.156	102.25	.314483	2.25044
16	37.156	105	.353867	4.99999
17	42.156	105	.401486	4.99999
18	47.1003	104.944	.448813	4.94433
19	48.8791	103.161	.473812	3.16132
20	49.1406	100.545	.488744	.544846
21	46.6427	97.5021	.478377	-2.49792
22	41.6427	95	.438345	-5
23	36.6427	95	.385713	-5
24	32.1312	95.4885	.336493	-4.51152
25	29.8621	97.7308	.305554	-2.26916
26	31.0662	101.204	.306966	1.20412
27	35.8104	104.744	.341885	4.74424
28	40.8104	105	.388671	4.99999
29	45.8104	105	.43629	4.99999
30	49.3014	103.665	.475583	3.66502
31	49.7694	100.975	.492888	.975121
32	47.5527	97.7833	.486307	-2.21667
33	42.5527	95	.447924	-5
34	37.5527	95	.395292	-5
35	32.7129	95.1601	.343767	-4.83987
36	29.8437	97.1308	.307253	-2.86917
37	30.3611	100.517	.302048	.51741
38	34.5909	104.23	.331871	4.22977
39	39.5909	105	.377056	4.99999
40	44.5909	105	.424675	4.99999

SOLVENCY MARGIN CALCULATION AND UNDERWRITING CYCLE

INITIAL SOLVENCY LEVEL .31
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .12
 RATE OF INFLATION .1
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	38.6254	110.125	.350741	5.24404
2	47.2739	121.137	.39025	5.76844
3	57.063	133.251	.428237	6.34529
4	67.3398	145.12	.464028	5.52368
5	77.0099	156.102	.493329	2.54636
6	84.8849	166.26	.510554	-2.65137
7	90.131	176.513	.510621	-9.29015
8	95.715	194.164	.49296	-10.2192
9	101.66	213.58	.475979	-11.2411
10	107.99	234.938	.459654	-12.3652
11	114.733	258.432	.443957	-13.6017
12	121.916	284.276	.428866	-14.9619
13	129.57	312.703	.414356	-16.4581
14	137.729	343.973	.400405	-18.1039
15	146.427	378.371	.386993	-19.9142
16	156.749	418.155	.374858	-19.9585
17	189.52	500.271	.378835	18.3459
18	228.815	554.505	.412646	24.3881
19	271.739	607.219	.447514	24.0905
20	314.169	656.887	.478269	15.4456
21	351.296	703.187	.499577	-2.39868
22	378.422	747.383	.506329	-28.7613
23	401.858	811.071	.495466	-42.688
24	426.808	892.178	.478389	-46.9568
25	453.376	981.396	.46197	-51.6524
26	481.672	1079.54	.446185	-56.8176
27	511.816	1187.49	.431007	-62.4994
28	543.937	1306.24	.416415	-68.7494
29	578.172	1436.86	.402385	-75.6243
30	614.669	1580.55	.388896	-83.1868
31	657.316	1745.54	.376569	-84.5698
32	792.256	2085.85	.379824	72.7316
33	953.661	2311.15	.412635	96.7183
34	1129.81	2530.87	.446414	94.9954
35	1304.03	2738.93	.47611	59.4636
36	1456.88	2934.12	.496531	-13.2888
37	1569.42	3121.7	.502745	-120.446
38	1666.67	3388.04	.491926	-178.318
39	1770.2	3726.85	.474986	-196.15
40	1880.45	4099.53	.458698	-215.765

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .31
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL .3
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .1
 RATE OF INFLATION .12
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	37.8218	111.122	.340365	5.2915
2	45.6112	124.456	.366484	5.92648
3	54.4913	139.391	.390924	6.63765
4	64.6005	156.118	.413794	7.43417
5	75.6428	173.997	.434737	7.47122
6	86.9148	192.503	.451499	5.99428
7	97.6071	211.744	.460968	2.85428
8	106.955	232.152	.460709	-1.80421
9	114.427	254.55	.449527	-7.48119
10	119.945	280.183	.428095	-13.2917
11	124.913	312.257	.400034	-16.4346
12	130.026	349.728	.371791	-18.4067
13	157.047	432.926	.362758	20.6155
14	187.86	484.877	.387438	23.0894
15	222.944	543.063	.410531	25.8601
16	261.639	605.956	.43178	26.6888
17	301.552	671.096	.449343	22.3172
18	339.849	738.722	.46005	12.0898
19	373.766	810.176	.461339	-3.65216
20	401.26	888.149	.451793	-23.3382
21	421.766	976.822	.431773	-44.0436
22	439.267	1086.2	.404406	-57.1685
23	457.278	1216.54	.375883	-64.0287
24	549.965	1503.02	.365906	68.7795
25	657.323	1686.67	.389717	80.3175
26	779.55	1889.07	.412664	89.9556
27	913.507	2106.25	.433712	91.2466
28	1050.75	2331.1	.450751	74.2974
29	1181.46	2564.76	.460649	37.1401
30	1296.25	2812.27	.460927	-18.6721
31	1388.48	3083.36	.450313	-87.2908
32	1456.82	3392.93	.42937	-158.195
33	1517.21	3778.4	.401547	-198.863
34	1579.34	4231.81	.373207	-222.727
35	1906.6	5238.53	.363957	249.454
36	2279.74	5867.15	.388559	279.388
37	2704.58	6571.21	.411581	312.915
38	3171.7	7329.51	.43273	320.214
39	3651.92	8114.74	.450035	264.328
40	4111.02	8930.33	.460344	137.869

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .3
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL 0
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST 0
 RATE OF INFLATION 0
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	31.812	103.775	.306548	3.7749
2	34.212	105	.325828	4.99999
3	36.612	105	.348685	4.99999
4	39.0119	105	.371542	4.99999
5	41.4119	105	.394399	4.99999
6	43.8119	105	.417257	4.99999
7	45.9041	104.359	.439869	4.35879
8	47.298	102.904	.459633	2.90385
9	47.6723	100.78	.473034	.779884
10	45.9221	98.2498	.467402	-1.75025
11	41.8889	95.9668	.436494	-4.0332
12	36.8889	95	.388304	-5
13	32.2882	95.3993	.338453	-4.60069
14	29.8563	97.5681	.306005	-2.43195
15	30.8744	101.018	.305632	1.01812
16	35.4795	104.605	.339176	4.6051
17	40.4795	105	.385519	4.99999
18	45.4795	105	.433138	4.99999
19	48.4337	103.779	.4667	3.77895
20	49.1017	101.392	.484277	1.39175
21	47.5729	98.4712	.483115	-1.52882
22	43.2451	95.6722	.452013	-4.3278
23	38.2451	95	.40258	-5
24	33.2451	95	.349949	-5
25	29.9902	96.7451	.309992	-3.25491
26	30.0037	100.013	.299997	.0134888
27	33.7927	103.789	.325591	3.78903
28	38.7927	105	.369455	4.99999
29	43.7927	105	.417074	4.99999
30	48.1583	104.366	.461438	4.36552
31	49.68	102.148	.486352	2.14823
32	48.8166	99.1366	.492418	-.863403
33	44.8347	96.018	.46694	-3.98196
34	39.8347	95	.419312	-5
35	34.8347	95	.366681	-5
36	30.9857	96.1511	.322261	-3.84894
37	29.9229	98.9372	.302443	-1.06282
38	32.4985	102.576	.316825	2.57561
39	37.4985	105	.357129	4.99999
40	42.4985	105	.404748	4.99999

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .3
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL 0
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .12
 RATE OF INFLATION .1
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	37.5678	110.125	.341138	5.24404
2	46.1554	121.137	.381017	5.76844
3	55.8801	133.251	.419359	6.34529
4	66.3323	145.573	.455663	5.97679
5	76.4479	157.039	.486808	3.48305
6	85.0239	167.624	.507229	-1.28732
7	90.92	177.707	.511629	-8.09595
8	96.5494	194.164	.497257	-10.2192
9	102.542	213.58	.480111	-11.2411
10	108.924	234.938	.463626	-12.3652
11	115.72	258.432	.447777	-13.6017
12	122.96	284.276	.432538	-14.9619
13	130.674	312.703	.417886	-16.4581
14	138.896	343.973	.4038	-18.1039
15	147.662	378.371	.390256	-19.9142
16	157.791	417.664	.377794	-20.4496
17	170.648	463.118	.368477	-18.8071
18	187.76	515.263	.364395	-14.8537
19	210.535	574.138	.366698	-8.99133
20	239.93	639.199	.37536	-2.24231
21	276.116	709.39	.38923	3.80383
22	318.245	783.348	.406263	7.20319
23	364.391	859.762	.423829	6.0025
24	411.705	937.791	.439016	-1.34436
25	456.806	1017.49	.448954	-15.5589
26	496.393	1100.17	.451197	-36.1846
27	528.007	1188.65	.444209	-61.3417
28	561.06	1306.24	.429524	-68.7494
29	596.281	1436.86	.414989	-75.6243
30	633.822	1580.55	.401014	-83.1868
31	673.844	1738.6	.387578	-91.5054
32	721.114	1921	.375384	-92.1143
33	782.074	2131.93	.366838	-82.5
34	863.689	2373.4	.363904	-62.4724
35	972.114	2645.06	.36752	-34.3982
36	1111.12	2943.92	.377428	-3.4873
37	1280.64	3264.74	.392263	22.5886
38	1475.83	3601.17	.409818	34.813
39	1686.98	3947.47	.427356	24.4763
40	1900.42	4300.41	.441917	-14.8877

SOLVENCY MARGIN CALCULATION AND UNDERWRITING CYCLE

INITIAL SOLVENCY LEVEL .3
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL 0
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .1
 RATE OF INFLATION .12
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	36.7738	111.122	.330933	5.2915
2	44.5129	124.456	.357659	5.92648
3	53.3403	139.391	.382667	6.63765
4	63.3942	156.118	.406067	7.43417
5	74.6307	174.474	.427746	7.94864
6	86.3822	193.503	.446413	6.99445
7	97.8273	213.218	.458814	4.32832
8	108.13	233.941	.46221	-.015564
9	116.625	256.379	.454891	-5.65164
10	123.036	281.676	.436801	-11.7986
11	128.153	312.257	.410409	-16.4346
12	133.421	349.728	.3815	-18.4067
13	140.216	394.309	.355599	-18.0015
14	151.172	448.801	.336835	-12.9874
15	169.358	514.395	.329238	-2.8078
16	197.722	591.258	.334408	11.9914
17	238.364	678.289	.35142	29.5103
18	286.428	762.964	.375415	36.3316
19	341.193	854.519	.399281	40.6913
20	403.51	957.061	.421613	45.5743
21	470.011	1063.73	.441852	42.8638
22	536.164	1173.96	.456714	30.5898
23	597.075	1288.98	.463213	8.41126
24	648.483	1412.13	.459222	-22.1075
25	687.968	1549.16	.44409	-57.1871
26	716.673	1709.16	.419313	-89.9557
27	746.237	1914.26	.389831	-100.75
28	780.774	2151.8	.362848	-105.011
29	834.043	2442.64	.341451	-84.9836
30	922.949	2794.82	.330236	-36.1174
31	1064.77	3211.23	.331578	40.582
32	1273.29	3687.83	.345268	136.698
33	1534.86	4176.13	.367532	198.863
34	1833.04	4677.26	.391905	222.727
35	2172.48	5238.53	.414711	249.454
36	2542.23	5836.57	.435569	248.803
37	2918.56	6455.47	.452107	197.17
38	3274.36	7099.22	.461228	89.9253
39	3584.21	7782.76	.460533	-67.6523
40	3830.89	8534.14	.448889	-258.313

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .6
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL 0
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST 0
 RATE OF INFLATION 0
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	55	95	.578947	-5
2	50	95	.526316	-5
3	45	95	.473684	-5
4	40	95	.421053	-5
5	35	95	.368421	-5
6	31.0899	96.0899	.32355	-3.9101
7	29.916	98.8261	.302714	-1.17393
8	32.3658	102.45	.315918	2.4498
9	37.3658	105	.355865	4.99999
10	42.3658	105	.403484	4.99999
11	47.2354	104.87	.45042	4.8696
12	50.2661	103.031	.487875	3.03072
13	50.208	99.9419	.502372	-.0581131
14	46.6848	96.4768	.483897	-3.52321
15	41.6848	95	.438787	-5
16	36.6848	95	.386156	-5
17	32.158	95.4732	.336828	-4.52676
18	29.861	97.703	.305631	-2.297
19	31.0334	101.172	.306738	1.17234
20	35.7538	104.72	.341422	4.72047
21	40.7538	105	.388132	4.99999
22	45.7538	105	.435751	4.99999
23	49.4383	103.684	.476815	3.68448
24	50.3903	100.952	.499151	.95195
25	47.9468	97.5565	.491477	-2.44354
26	42.9468	95	.452071	-5
27	37.9468	95	.39944	-5
28	32.9658	95.019	.346939	-4.98099
29	29.8383	96.8725	.308016	-3.12748
30	30.0591	100.221	.299929	.220848
31	34.0661	104.007	.327537	4.00694
32	39.0661	105	.372058	4.99999
33	44.0661	105	.419677	4.99999
34	48.3359	104.27	.463566	4.2698
35	50.3162	101.98	.493392	1.98034
36	49.0564	98.7401	.496823	-1.25989
37	44.5495	95.4932	.466521	-4.50681
38	39.5495	95	.416311	-5
39	34.5495	95	.363679	-5
40	30.8064	96.2568	.320043	-3.7432

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .6
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL 0
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .1
 RATE OF INFLATION .12
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	64.8583	104.766	.619076	-1.06364
2	67.6871	112.603	.601112	-5.92648
3	70.6174	126.116	.559942	-6.63767
4	73.6502	141.249	.52142	-7.43417
5	76.7858	158.199	.485374	-8.32628
6	80.0239	177.183	.451645	-9.32544
7	83.3637	198.445	.420084	-10.4445
8	86.8037	222.259	.390553	-11.6978
9	90.7871	249.774	.363477	-12.2573
10	96.905	283.469	.341855	-10.0062
11	107.121	324.29	.330325	-4.40128
12	123.453	372.595	.331334	4.4606
13	147.523	427.933	.344734	15.6224
14	177.879	484.877	.366853	23.0894
15	212.484	543.063	.391269	25.8601
16	251.878	608.23	.414116	28.9633
17	294.867	677.809	.435029	29.0302
18	338.705	749.824	.451712	23.1912
19	380.24	824.709	.461059	10.8812
20	416.502	904.168	.460647	-7.31946
21	445.449	991.422	.449303	-29.444
22	466.801	1091.34	.427731	-52.0272
23	486.134	1216.54	.399602	-64.0287
24	506.128	1362.72	.371409	-71.5182
25	535.039	1542.08	.34696	-64.2732
26	583.672	1760.8	.33148	-38.3096
27	663.85	2022.21	.32828	7.20056
28	785.997	2325.21	.338032	68.4067
29	951.118	2654	.358371	126.381
30	1139.45	2972.49	.383333	141.547
31	1353.95	3329.18	.40669	158.532
32	1593.22	3719.81	.428308	168.679
33	1843	4124.69	.44682	147.429
34	2085.76	4544.29	.458985	89.7598
35	2303.81	4985.66	.462088	-3.4126
36	2483.21	5464.1	.454459	-123.67
37	2618.4	6004.12	.4361	-254.173
38	2727.26	6658.83	.40957	-350.465
39	2839.32	7457.89	.380714	-392.521
40	2985.21	8410.97	.354918	-381.486

SOLVENCY MARGIN CALCULATION AND UNDERWRITNG CYCLE

INITIAL SOLVENCY LEVEL .6
 INITIAL PREMIUM LEVEL 100
 DESIRED LEVEL OF SOLVENCY .4
 MINIMUM SOLVENCY LEVEL 0
 MAXIMUM UNDERWRITING LOSS .95
 MINIMUM UNDERWRITING LOSS 1.05
 RATE OF INTEREST .12
 RATE OF INFLATION .1
 RATE OF UNUSED TAX AT BEGINNING 0

YEAR	FUND AT END	PREMIUMS	SOLVENCY MARGIN	UNDERWRITING PROFIT
1	65.4093	102.896	.635686	-1.9853
2	69.3984	109.601	.633194	-5.76845
3	73.6394	120.561	.610808	-6.34529
4	78.1491	132.617	.589286	-6.97983
5	82.9453	145.878	.568592	-7.67781
6	88.0472	160.466	.548697	-8.44559
7	93.4755	176.513	.529568	-9.29015
8	99.2521	194.164	.511177	-10.2192
9	105.401	213.58	.493494	-11.2411
10	111.947	234.938	.476493	-12.3652
11	118.917	258.432	.460148	-13.6017
12	126.341	284.276	.444432	-14.9619
13	134.25	312.703	.429322	-16.4581
14	142.678	343.973	.414795	-18.1039
15	151.661	378.371	.400827	-19.9142
16	161.238	416.208	.387398	-21.9057
17	172.566	459.903	.375223	-22.0218
18	187.19	510.43	.366729	-19.687
19	206.776	568.266	.363871	-14.8626
20	232.792	633.318	.367576	-8.12366
21	266.132	704.86	.377567	-.72583
22	306.765	781.634	.392466	5.4892
23	353.518	862.12	.410056	8.36084
24	404.05	944.944	.427592	5.8092
25	455.085	1029.34	.442111	-3.70337
26	502.881	1115.63	.450762	-20.7279
27	543.944	1205.53	.451209	-44.4612
28	577.916	1306.24	.442427	-68.7494
29	614.107	1436.86	.427395	-75.6243
30	652.674	1580.55	.412942	-83.1868
31	693.782	1738.6	.399046	-91.5054
32	737.96	1913.11	.385737	-100.004
33	790.91	2115.23	.373913	-99.2029
34	859.775	2348.74	.366058	-87.1375
35	952.086	2615.51	.364015	-63.9519
36	1074.26	2914.76	.368559	-32.6433
37	1229.9	3242.86	.379263	.712647
38	1418.23	3593.86	.394627	27.5007
39	1633.26	3960.86	.41235	37.8586
40	1863.74	4337.85	.429646	22.5527