SOCIETY OF ACTUARIES

Article from:

The Financial Reporter

September 2001 – Issue 47

XXX and Minimum Standards

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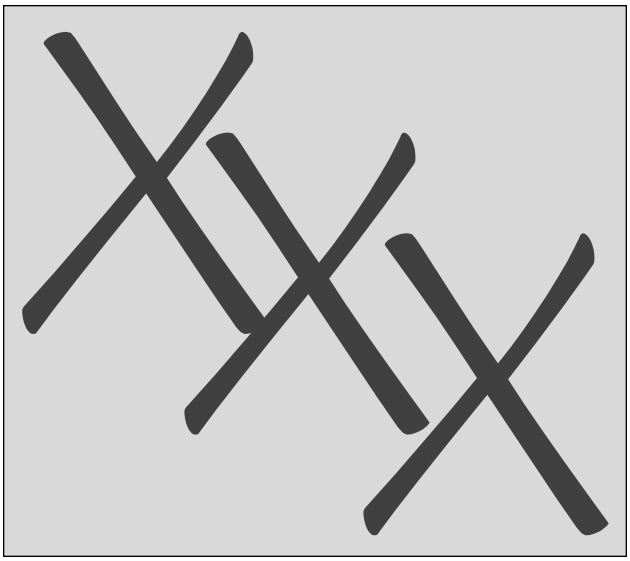


The Valuation of Life Insurance Policies Regulation (XXX) has generated a great amount of discussion, especially with respect to how to set and test X factors and which product designs are subject to XXX. While these are important areas that warrant much attention, they have overshadowed (Oops, can I use that word, "over-shadowed?") a paradigm shift in the calculation of premium deficiency reserves (PDR). This paradigm shift is the change from one minimum standard of valuation to separate minimum standards for basic reserves and PDR. This article will focus on how XXX seeks to implement this concept and its effect on PDR calculations.

In a net premium reserving methodology, PDR result if the net premium is greater than the gross premium actually charged. Since the present value of the gross premiums is less than the present value of net premiums assumed in the reserve formula, the present value of this "deficiency" is set up as an additional reserve. Prior to the 1976 Amendments to the Standard Valuation Law (SVL), the net premium used in this comparison was the net premium computed under the method, mortality and interest rate actually used to calculate the reserves. However under this manner of computation, PDR could result from simply using interest or mortality assumptions more conservative than minimum standards.

The 1976 Amendments rearranged the way of thinking about PDR. They eliminated the term deficiency reserves, but instead defined the minimum reserve on "deficient" policies. Deficient policies are those whose gross premium is less than the net premium computed under the method used to compute the basic reserve, but using the minimum allowable standards of mortality and interest. The minimum reserve is the greater of the reserve calculated under the chosen method, mortality and interest rate and the reserve calculated under the same method but with minimum standards of mortality and interest and using gross premiums when less than net premiums. This remedied the PDR problems that could be caused by using a conservative basis, by both using the same net premium regardless of the choice of mortality and interest and recognizing the excess of conservative reserves held over minimum standard reserves. Unfortunately, the offset of PDR by reserves in excess of the minimum standards set the stage for what I consider an anomaly in XXX's attempt to establish separate minimum standards for basic reserves and PDR.

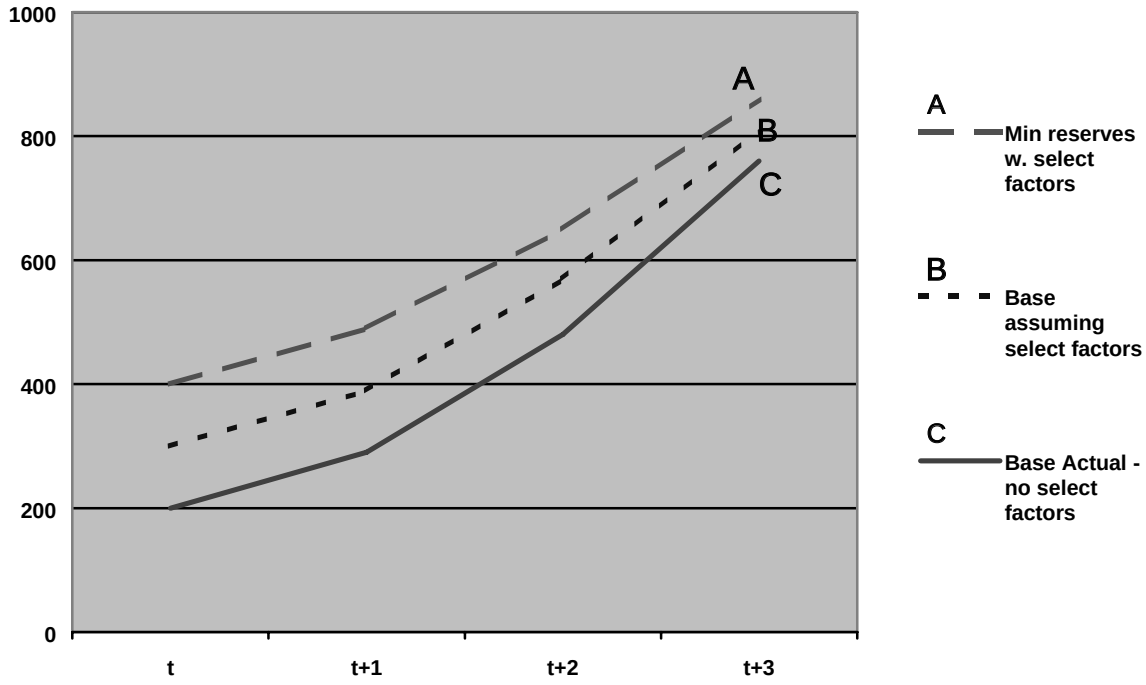
When the 1976 Amendments were approved, there was only one minimum mortality standard for males and one for females. With the introduction of the 1980 CSO tables, the minimum mortality standard became a choice between the 1980 CSO tables with or without 10-year selection factors. However, any one plan still had just one minimum mortality standard for both basic reserves and PDR. As the Report in TSA XXXIII (p. 617) states, "The basis chosen for a particular plan should be used to value both the basic life insurance reserve and the deficiency reserve." It was not until the adoption of the Smoker/Nonsmoker Regulation (NAIC #812) that the separate minimum mortality standards could apply to basic reserves and PDR on the same policy. Unlike XXX, though, the Smoker/Nonsmoker Regulation is not specific on how to apply these separate minimum standards.

One of the purposes of XXX was to free companies from the PDR burden of early 1970's mortality on business priced and underwritten over 20 years later. What XXX did not attempt to address was the conservatism the 1980 CSO provided to the basic reserves, at least partially to avoid possible tax implications. To manage this split, XXX permits a separate choice of basic reserve mortality and PDR mortality, allowing PDR to be calculated under what is essentially company experience mortality, subject to certain restrictions. Specifically, Section 5(a) addresses the calculation of base reserves referencing the use of the 1980 CSO table and an option to include one of several specified select factors. Section 5(b) defines deficiency reserves as the Quantity A less the basic reserves. The Quantity A equals the recalculation of the base reserves using gross premiums when less than the net premium, the 1980 CSO table, and options for select factors that include company specific X factor adjustments. But does XXX successfully "de-couple" the mortality basis for basic reserves and PDR? Yes and no. Yes, because if the policy is not deficient, then calculations under Section 5(b) are not required by the SVL. However, if the policy ends up being deficient, then the answer is no. A close examination of XXX shows how this dichotomy happens.

Quantity A is calculated using PDR mortality. There is no mention of recalculating the basic reserve using mortality

different from that elected in Section 5(a). Given a constant interest rate, the level of reserves on a product is strongly influenced by the slope of the mortality used. The steeper the mortality, the greater amount of pre-funding is needed for future years. Both select tables available under XXX will generally yield higher basic reserves than the 1980 CSO without select factors. The IRS has recognized this, thus the prohibition on select tables for tax reserves. Therefore, if the policy is deficient and different mortality is chosen for basic reserves and PDR, the excess of basic reserves calculated using PDR mortality over basic reserves actually held is included in the PDR. In essence, the PDR mortality is imposed on the basic reserve.

This can be illustrated in the following chart. The minimum reserves are represented by line A, the base reserves are represented by line C. Note that the excess of line B (bases reserves recalculated using the same mortality as the minimum reserves) over line C is included in the excess PDR.



This unequal treatment of policies that are deficient compared to those that are not has an interesting consequence. Consider PDR as a multivariate function, one of whose variables is gross premium. Prior to XXX, PDR was a continuous function with respect to gross premium; that is, a small increase in the (deficient) gross premium would yield a small decrease in the PDR. Now with XXX, policies with different mortality bases have a discontinuity in the PDR function with respect to the gross premium variable in the neighborhood of the net premium. If the gross premium were just a little above the net premium, there would be no PDR, regardless of the difference between Quantity A and the basic reserve. If the gross premium were one penny less, non-trivial PDR could result, not from any big premium deficiency, but simply because two minimum standards interact despite the intention that they should be separate. This discontinuity could put more pressure on the valuation actuary to "nudge" the X factors down than if the PDR function was continuous.

The accompanying Table 1 (page 13) demonstrates the discontinuity. It shows basic reserves for whole life and level level premium 20-year term, for age 35 male non-smokers using 1980 CSO Male Nonsmoker, 1980 CSO Male Nonsmoker with 10-year selection factors and 1980 CSO Male Nonsmoker with 19-year selection factors (X = 100%), all age last birthday. It shows the minimum PDR that would result if the policies were deficient and used 1980 CSO Male Nonsmoker with no selection factors as the basic reserve mortality table and the other two choices as the PDR mortality table. Because of the non-decreasing requirement imposed on X factors by XXX, any choice of X factors would be at least as steep as the 19-year selection factors, possibly resulting in even larger discontinuities.

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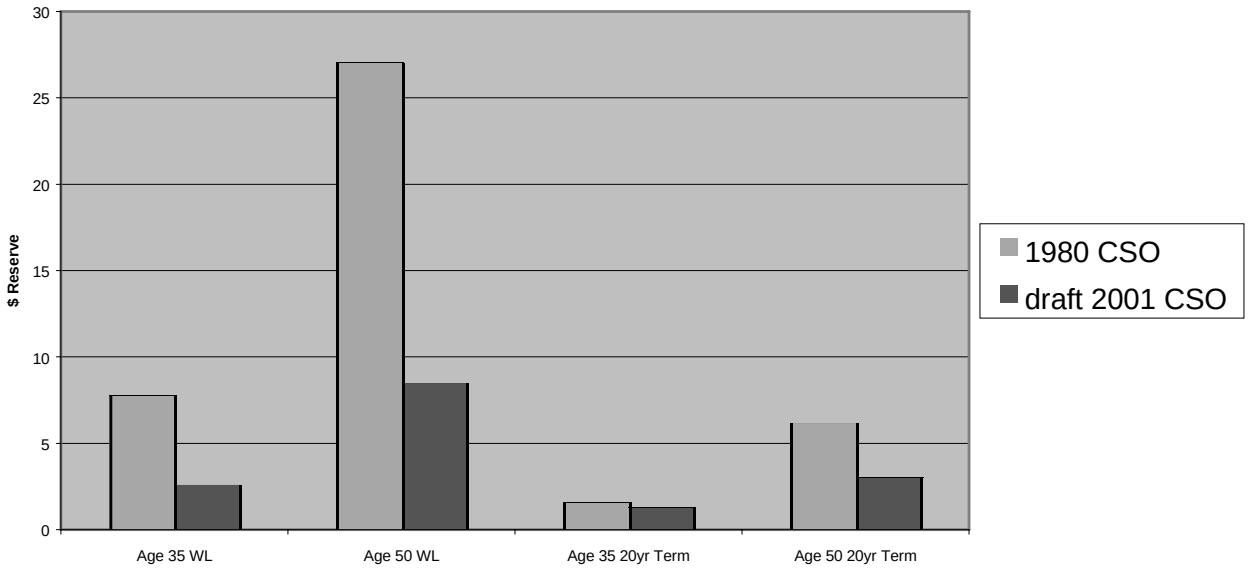
With the adoption of the new 2001 CSO table, the effect of the discontinuity is lessened for at least some ages and plans. The chart below shows varying levels of reduction in the maximum discontinuity between the select table reserves and the ultimate table reserves for male nonsmokers. However, the discontinuity remains, and could be larger if X factors are used.

Maximum Discontinuities on a Reserve/1000 Basis



Is this inequitable treatment of deficient policies a goal of XXX? Not one of the drafters of XXX with whom I spoke said this was an anticipated, much less desired, effect. On the contrary, all of the literature that I have found that discusses the concept of separate mortality bases for basic reserves and PDR does not differentiate between deficient and non-deficient policies. How can this dichotomy between deficient and non-deficient policies be resolved? The Commissioners could permit the interpretation that the basic reserves used in Section 5(b) are basic reserves recalculated on the same mortality basis as the Quantity A. This would effectively "de-couple" the minimum standards for basic reserves and PDR for deficient policies, putting them on an equal basis with non-deficient polices, true to the spirit of XXX. It would retain the minimum minus basic concept introduced in the 1976 Amendments. It would restore continuity to PDR, reducing the pressure to "game" the system. Finally, it would restore an expected pattern to PDR, one that starts high and gradually decreases, a credible pattern that matches well with the concept of the present value of future premium deficiencies.

As a disclaimer, it should not be inferred that the views I have expressed are those of my employer, nor do these views reflect how my employer calculates its reserve liabilities. They are solely my personal professional opinion.

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TABLE 1

Whole Life	**CSO80 MNSALB, CRVM curtate**								**Terminal Reserves**	
AGE=35	α 1.6555024		β 11.152845							
	0.00	9.85	20.05	30.60	41.51	52.78	64.42	76.43	88.83	101.61
	114.79	128.36	142.33	156.71	171.51	186.71	202.30	218.26	234.56	251.19
	268.13	285.38	302.94	320.80	338.92	357.29	375.86	394.59	413.40	432.27
	451.17	470.08	489.01	507.95	526.86	545.66	564.27	582.56	600.40	617.75
	634.61	651.01	667.01	682.67	698.01	712.99	727.50	741.43	754.66	767.18
	779.00	790.22	800.98	811.48	821.91	832.53	843.62	855.57	868.74	883.35
	899.33	916.16	932.56	945.78	1000.00					
Whole Life	**CSO80 MNSALB 10yr Select, CRVM curtate**								**Terminal Reserves**	
AGE=35	α 1.2416268		β 11.076016							
	0.00	10.13	20.55	31.24	42.32	53.66	65.37	77.48	89.98	102.89
	116.04	129.59	143.55	157.91	172.68	187.86	203.43	219.37	235.64	252.25
	269.17	286.39	303.93	321.76	339.86	358.20	376.75	395.44	414.24	433.08
	451.95	470.83	489.73	508.64	527.53	546.31	564.89	583.15	600.97	618.29
	635.13	651.50	667.48	683.12	698.44	713.39	727.89	741.79	755.01	767.51
	779.31	790.51	801.26	811.74	822.16	832.77	843.84	855.77	868.93	883.51
	899.48	916.28	932.66	945.86	1000.00					
Whole Life	**CSO80 MNSALB 19yr Select, CRVM curtate**								**Terminal Reserves**	
AGE=35	α 0.678756		β 10.603394							
	0.00	10.23	20.71	31.48	42.64	54.27	66.31	78.78	91.63	104.92
	118.66	132.81	147.40	162.41	177.89	193.66	209.70	225.94	242.32	258.78
	275.55	292.62	310.00	327.68	345.62	363.80	382.19	400.72	419.35	438.03
	456.73	475.45	494.19	512.93	531.65	550.27	568.69	586.79	604.45	621.63
	638.31	654.55	670.38	685.89	701.07	715.89	730.26	744.05	757.15	769.54
	781.24	792.34	803.00	813.39	823.72	834.23	845.21	857.03	870.07	884.53
	900.35	917.01	933.25	946.33	1000.00					
Minimum Terminal Deficiency Reserves Using CSO80 MNSALB 10 Yr Select										
AGE=35	0.00	0.28	0.50	0.64	0.81	0.88	0.95	1.05	1.15	1.28
	1.25	1.23	1.22	1.20	1.17	1.15	1.13	1.11	1.08	1.06
	1.04	1.01	0.99	0.96	0.94	0.91	0.89	0.85	0.84	0.81
	0.78	0.75	0.72	0.69	0.67	0.65	0.62	0.59	0.57	0.54
	0.52	0.49	0.47	0.45	0.43	0.40	0.39	0.36	0.35	0.33
	0.31	0.29	0.28	0.26	0.25	0.24	0.22	0.20	0.19	0.16
	0.15	0.12	0.10	0.08	0.00					
Minimum Terminal Deficiency Reserves Using CSO80 MNSALB 19 Yr Select										
AGE=35	0.00	0.38	0.66	0.88	1.13	1.49	1.89	2.35	2.80	3.31
	3.87	4.45	5.07	5.70	6.38	6.95	7.40	7.68	7.76	7.59
	7.42	7.24	7.06	6.88	6.70	6.51	6.33	6.13	5.95	5.76
	5.56	5.37	5.18	4.98	4.79	4.61	4.42	4.23	4.05	3.88
	3.70	3.54	3.37	3.22	3.06	2.90	2.76	2.62	2.49	2.36
	2.24	2.12	2.02	1.91	1.81	1.70	1.59	1.46	1.33	1.18
	1.02	0.85	0.69	0.55	0.00					

20 Year Term	**CSO80 MNSALB, CRVM curtate**								**Terminal Reserves**	
AGE=35	α 1.6555024		β 3.303061							
	0.00	1.63	3.23	4.76	6.23	7.60	8.86	9.99	10.96	11.75
	12.33	12.65	12.69	12.41	11.75	10.66	9.04	6.80	3.83	0.00
20 Year Term	**CSO80 MNSALB 10yr Select, CRVM curtate**								**Terminal Reserves**	
AGE=35	α 1.2416268		β 3.1889973							
	0.00	1.88	3.65	5.30	6.89	8.29	9.59	10.77	11.81	12.68
	13.18	13.42	13.38	13.02	12.27	11.08	9.37	7.02	3.94	0.00
20 Year Term	**CSO80 MNSALB 19yr Select, CRVM curtate**								**Terminal Reserves**	
AGE=35	α 0.678756		β 2.4378301							
	0.00	1.69	3.23	4.65	6.02	7.40	8.71	9.93	10.99	11.92
	12.69	13.23	13.52	13.49	13.15	12.23	10.62	8.17	4.69	0.00
Minimum Terminal Deficiency Reserves Using CSO80 MNSALB 10 Yr Select										
AGE=35	0.00	0.25	0.42	0.54	0.66	0.69	0.73	0.78	0.85	0.93
	0.85	0.77	0.69	0.61	0.52	0.42	0.33	0.22	0.11	0.00
Minimum Terminal Deficiency Reserves Using CSO80 MNSALB 19 Yr Select										
AGE=35	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.17
	0.36	0.58	0.83	1.08	1.40	1.57	1.58	1.37	0.86	0.00