Article from:

Product Development News

August 2001 – Issue No. 51

Federal DAC Tax

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In the book "The Education of T. C. MITS," the author offers an example of a problem that 50,000,000 people reportedly got wrong. The reader is presented with a choice of two patterns of salary increase and asked which would be preferable.[1] The author demonstrates that the pattern that virtually no one selected always pays the same as or more than the alternative almost everyone chose. In actuarial work, we are frequently confronted with problems with more than one apparently reasonable answer. This article deals with one of these, where the Federal DAC cost can be applied in an apparently reasonable, but incorrect, manner.

Section 848 of the internal revenue code requires insurance companies to capitalize acquisition expenses on certain contracts. For non-pension life and annuity contracts, the capitalized amount is a percentage of premiums, regardless of the actual acquisition costs incurred. In addition, this applies to all premiums, even though they are received long after the policy's issue when acquisition costs generally occur. Because of the dubious relationship of these amounts to acquisition costs and the arbitrary manner of their determination, they are sometimes referred to as Pseudo Deferred Acquisition Costs (PDAC) and the tax effect as the PDAC tax (or DAC tax for short).

Actually, as with other capitalization required under the internal revenue code, no overall extra tax is usually generated, because the capitalized costs are all eventually amortized back into taxable income, reducing it. In the case of companies with small amounts of PDAC in a given tax year (at or below $10 million), the amortization period for the first $5 million is 60 months. However, the PDAC to which this relatively short period applies is reduced to zero when total PDAC is $15 million in the tax year. Any excess PDAC must be amortized over 120 months, making it even more costly.

PDAC amortization starts in the middle of the tax year that gave rise to it. This leads to the following formula for the approximate cost of the PDAC:

$$C = TR \cdot R \cdot \left[1 - \left(a_p + \ddot{a}_p\right)/2p\right]$$

where

C is the PDAC cost as a percentage of premium;
TR is the applicable tax rate (usually 35%);
R is the PDAC rate: 1.75% for annuities, 2.05% for group life and 7.7% for any life or non-cancelable A&H contract;
p is the amortization period in years; and
a and $\ddot{a}$
are annuities certain at a selected after tax interest rate (for pricing, this is usually fairly high).

Applying this formula produces the following table of illustrative PDAC costs for non-pension annuities (in basis points):

	Interest Rate			
p	9%	11%	13%	15%
5 Years	11	13	15	17
10 Years	20	23	26	28

The costs for other products can be estimated from the above by simply multiplying the appropriate cost by the ratio of their PDAC factor to 1.75%. Thus, individual non-pension life subject to 10-year amortization has a PDAC cost of approximately 123 BP if a 15% interest rate is used (28 x 7.7 / 1.75 = 123). Using the formula produces a value of 124 BP.

At this point, all we need to do is reflect this cost in the pricing of our product, as a percentage of premium, just like we do for any other premium related cost (e.g., commissions). In order to retain the desired profitability, this will require that we recover the cost by increased charges to the policyholder. Unfortunately, this can produce a pricing answer that is not correct. This can happen for two reasons:

1. If the PDAC cost is handled just like any other percentage of premium cost, the pricing will assume that it is deductible if no adjustment is made. However, this is not true. PDAC costs aren't deductible items for federal taxes in the computation of taxable income. One way to deal with this to "gross up" the PDAC cost by dividing it by one less the tax rate. Thus, the 28 BP in our example becomes 43 BP, and the 124 BP becomes 190 BP. If the PDAC cost is directly charged to the policyholder, the 190 BP becomes taxable income and 124 BP (190 BP x 65%) remains after tax to pay for the cost of the PDAC.

2. In addition, the loading charged to recoup the PDAC cost can have the secondary effect of changing the level and/or incidence of projected profits. For example, if the PDAC cost is charged as an up front premium load, the funds in the contract are reduced, as are future contract loads. On the other hand, if interest spread is increased to offset the PDAC cost, the growth of funds accumulated in the policy, and therefore the level of future interest spreads, will fall, but with a different incidence.

To illustrate this, consider a single, premium annuity with a premium of $1000, commission of 5%, acquisition costs of $24.37, an interest spread of 2% and net investment income of 8%. Funds under this annuity will accumulate at the resulting 6% interest credit. No surrender charges or administration costs are assumed, and the contract is assumed to surrender at the end of year five for simplicity.

We can assume the latter as long as we know the PDAC cost on a present value basis, since its amortization is independent of the product's life. However, this won't work very well if we try to solve for a rate of return and is done here only to make the illustration easier to follow. In actual practice, it will generally be better to model PDAC amounts and their subsequent amortization as a period by period adjustment to statutory gains in order to obtain a realistic taxable income.

Continuing our illustration:

Year	EOY Fund	Spread	Commission & Expenses	Gain	Tax	Net Gain	PV @ 15%
0	1,000.00	0.00	74.37	(74.37)	(26.03)	(48.34)	(48.34)
1	1,060.00	20.00	0.00	20.00	7.00	13.00	11.30
2	1,123.60	21.20	0.00	21.20	7.42	13.78	10.42
3	1,191.02	22.48	0.00	22.48	7.87	14.61	9.61
4	1,262.48	23.82	0.00	23.82	8.34	15.48	8.85
5	0.00	25.24	0.00	25.24	8.83	16.41	8.16
Subtotal							0.00
PDAC Cost							2.80
Total PV							(2.80)

Thus, our hypothetical product has a return of exactly 15% before the advent of the DAC tax, but earns somewhat less (12.74%) when recognition of the PDAC cost becomes necessary. If we make a charge only for the PDAC cost, the return is 14.07%, still not up to 15%. Even if we gross up the PDAC cost, the situation improves (to a return of 14.82%), but still not quite enough, as is shown:

		Charge 2.80				Charge 4.31 = (2.80/.65)		
Year	EOY Fund	Spread	Net Gain	PV@ 15%	EOY Fund	Spread	Net Gain	PV @ 15%
0	997.20	0.00	(46.52)	(46.52)	995.69	0.00	(45.54)	(45.54)
1	1,057.03	19.94	12.96	11.27	1,055.43	19.91	12.94	11.25
2	1,120.45	21.14	13.74	10.39	1,118.76	21.11	13.72	10.37
3	1,187.68	22.41	14.57	9.58	1,185.88	22.38	14.54	9.56
4	1,258.94	23.75	15.44	8.83	1,257.04	23.71	15.42	8.82
5	0.00	25.18	16.37	8.14	0.00	25.14	16.34	8.12
Subtotal				1.69				2.59
PDAC Cost				2.80				2.80
Total PV				(1.11)				(.21)

It turns out that the correct premium loading to restore the desired 15% return in this example is 4.65, or 1.66 times the unadjusted PDAC cost of 2.80. This is the amount (after tax is paid on it) which will exactly offset both the PDAC cost and the loss of spread income due to the reduced policy funds in our example. While one could have iterated to get this loading, there is an alternative way in this case to obtain it which is instructive. If we let L be the desired loading, C be the PDAC cost, V be the after tax present value (at the desired rate of return) of spreads without the DAC tax and prem be the premium, we have

$$L = (C + L \times V / prem) / .65 \Rightarrow L = C / (.65 - V / prem) = 2.80 / (.65 - .04834) = 4.65$$

It should be noted that this holds only if the premium in question is single, the spreads are uniformly affected by the PDAC charge, the PDAC charge is made when the premium is received, and no element of the product besides the spreads are affected by the PDAC or the charge for it. Very few real life products will actually meet these conditions, so this formula should be viewed more as instructional and probably shouldn't be used in the pricing process except as a reasonableness check. This says that, at least for this kind of loading charge and product, the needed amount also depends on the ratio of the after tax value of fund related items to the premium giving rise to the PDAC. While this is fairly small in this example, it could be a lot larger if V were larger. This will tend to happen

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for many accumulation products as acquisition costs increase. In the case of a life contract, the situation is even more complex since the net amount at risk and any related charges are also impacted by changes in the fund balance.

For traditional life products, the DAC tax loading would probably be in the form of an increased premium and the grossed up cost would suffice (if it weren't for the need to gross it up further for percentage of premium costs such as commissions and premium taxes). For UL products, the load will tend to pull down funds and can therefore produce effects similar to those outlined above except that they will be over four times bigger because of the greater PDAC rate.

However, life products also have mortality spreads that may be influenced by the loading in different ways. Reductions in funds will also cause differences in amounts at risk and therefore in mortality margins. For a typical (Option A) UL plan, this will generally result in higher mortality margins that will tend to mitigate the lost fund revenue. However, for highly funded products that qualify as life insurance using the cash value test under IRC Sec. 7702, amounts at risk may be less than they would have been in the absence of the DAC tax load. This is due to the fact that fund increases for these products drive up the insured amounts and this is generally amplified by a factor greater than one. This in turn will tend to increase the needed loading still further.

The following example is based on a rather contrived product. It is a single-premium life contract funded at the CVAT limit and assumed to surrender after five years. The COI charges are set equal to the expected mortality. The other loads are designed to produce a 15% return and to be similar to the annuity described above with commissions reduced to 3% to pay a 2% premium tax. The major difference is the higher PDAC expense. We have also simplified the product for illustration purposes by assuming that COIs are collected at year-end, just prior to the death payments, in order to avoid complications due to the time value of money since our discount rate does not equal the fund accumulation rate. (The more common model for insurance products is to collect the COIs at the beginning of the period, and to pay the death claims at the end of the period.) Finally, to maintain a 15% return, we had to reduce the acquisition expense to $23.97. The reduction is because the fund will grow at a lower rate due to the deduction of COIs, thereby reducing the spread income we are able to achieve.

Year	EOY Fund	Spread	Commissions & Expenses	Gain	Tax	Net Gain	PV@15%
0	1,000.00	0.00	(73.97)	(73.97)	(25.69)	(48.08)	(48.08)
1	1,057.18	20.00	0.00	20.00	7.00	13.00	11.30
2	1,117.27	21.14	0.00	21.14	7.40	13.74	10.39
3	1,180.36	22.35	0.00	22.35	7.82	14.52	9.55
4	1,246.55	23.61	0.00	23.61	8.26	15.34	8.77
5	0.00	24.93	0.00	24.93	8.73	16.21	8.06
Subtotal							0.00
PDAC Cost							12.41
Total PV							(12.41)

The return of this product is exactly 15% before PDAC but is only 6.27% when PDAC is recognized. The next tables show what the product would look like if we charged (a) the actual PDAC cost, and (b) the PDAC cost grossed up for FIT.

	Charge 12.41				Charge 19.09 = (12.41/.65)			
Year	EOY Fund	Spread	Net Gain	PV@ 15%	EOY Fund	Spread	Net Gain	PV @ 15%
0	987.59	0.00	(40.01)	(40.01)	980.91	0.00	(35.67)	(35.67)
1	1,044.06	19.75	12.84	11.16	1,038.88	19.62	12.75	11.09
2	1,103.41	20.88	13.57	10.26	1,098.14	20.74	13.48	10.19
3	1,165.72	22.07	14.34	9.43	1,160.38	21.92	14.25	9.37
4	1,231.08	23.31	15.15	8.66	1,225.70	23.16	15.05	8.61
5	0.00	24.62	16.00	7.96	0.00	24.46	15.90	7.90
Subtotal				7.47				11.49
PDAC Cost					12.41			12.41
Total PV				(4.94)				(0.92)

Again, we see that charging the PDAC cost leaves us short of our desired 15% return, producing a return of only 11.09%, and charging the PDAC grossed-up for income taxes produces a return of 14.22%. It turns out that the correct premium loading to restore the desired 15% return in this example is $20.62, and the ratio of the final load to the PDAC is 1.66 for this simple product, just as it was for the annuity example.

For a product with higher acquisition expenses, the ratio of the final load to the PDAC can become even higher. Using the above model, we tested a UL contract with acquisition expenses of 23% of premium. (While this level of acquisition expenses would not likely be seen in a single-premium UL product, it is not at all unreasonable for other life-insurance products.) To pay for these increased expenses, the interest spread had to be increased from 2% to 6.75%. The ratio of the final load to the PDAC is 200% and would be even higher with higher acquisition expenses. In the case of a more realistic life product which has positive mortality margins, the reduced fund balance would generate higher COI margins and make the ratio of the final load to the PDAC unpredictable.

The interactions in real products are much more complex and hard to predict. The actual tax effects of the PDAC should be included in the basic pricing runs to produce the best results. Trying to price PDAC as an add-on is prone to potentially significant error, and this error may not be detected because the actuary already thinks the proper charge has been made and moves on to other issues. This is more difficult to do for products that are priced on a “menu” basis with many of the loads being customized by the client. However, base runs of a typical product can be used to inform the actuary of the level of the true cost based on that product structure.

Appendix: Solution to the salary puzzle.

Interestingly, pattern #2 is the better choice! Note the salaries in the table below:

As you can see, the person electing pattern number two always receives the same as, or more than, the person electing pattern number one.

	Salary 1	Salary 2	Pay This Period		Cummulative Pay	
Time Period	(annual)	(semiannual)	Pay 1	Pay 2	Pay 1	Pay 2
First six months	30,000	15,000	15,000	15,000	15,000	15,000
Second six months		16,500	15,000	16,500	30,000	31,500
Third six months	36,000	18,000	18,000	18,000	48,000	49,500
Fourth six months		19,500	18,000	19,500	66,000	69,000
Fifth six months	42,000	21,000	21,000	21,000	87,000	90,000
Sixth six months		22,500	21,000	22,500	108,000	112,500
Seventh six months	48,000	24,000	24,000	24,000	132,000	136,500
Eighth six months		22,500	24,000	25,500	156,000	162,000

Endnote

(1) *The Celebrated Man in the Street*, by Lillian Lieber. We have updated the original numbers to account for inflation. Pattern number one is an annual salary of $30,000, with annual raises of $6,000. Pattern number two is a semiannual salary of $15,000, with semiannual raises of only $1,500. Assume that you are paid monthly; for example, your first month’s salary would be $2,500 under either pattern number one or number two. Which salary pattern would you prefer? The solution was given in the appendix.

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