Treatment of Taxes in Principles-Based Reserves

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Abstract
This paper will provide demonstrations of the following three statements:

- That the calculation of principles-based reserves should ignore federal income taxes.

- That the currently required statutory deferred tax calculation would need to be changed to permit an appropriate deferred tax asset to accompany such reserve so that the result can be correctly principles-based on a post-tax basis.

- That the Tax DAC, pursuant to Section 848 of the Internal Revenue Code, is effectively a negative tax reserve.

This paper also discusses two concerns:

- That any change to the currently required statutory deferred tax calculation formula, to make it realistic, will probably run into substantial resistance. Nevertheless, consideration should be given to changing these requirements.

- That there can be a major gap between theoretically appropriate formulas and the practical applications thereof, but attempts to narrow those gaps should be made.

I. Introduction

The annual statement reports income before tax, then adjusts for taxes below the line. Much discussion has taken place about how or whether to include a provision for income taxes in the Principles-Based Approach (PBA) to reserves.[1] In particular, some discussion has involved questions as to treatment of the DAC tax (Code Section 848) in the PBA process.

This paper describes the theoretical basis to respond to both of those issues. While recognizing that there may be substantial regulatory and administrative complexity involved in implementing this approach, it is important to understand this theoretical basis for two reasons:

[1] The migration to PBA has been a relatively recent one on the part of the actuarial profession, dealing with how life insurance and annuity reserves are to be calculated in life insurance companies in the future. Its purpose is a move toward more realistic life insurance and annuity reserve levels through use of more realistic mortality and interest assumptions, the addition of other assumptions to the calculations (such as lapses and expenses), and the use of stochastic models instead of – or in addition to – traditional formula approaches.

- We need to know the theoretical basis from which the pragmatic approach is deviating—and to what extent—in order to make such deviation as small as reasonably possible.

- Companies may wish to use this theoretical basis for internal reporting reasons to obtain a more rational basis for valuing tax expense and adjust post-tax statutory income to a more realistic basis.

That said, it appears that the theoretical basis should satisfy the following criteria:

1) The theoretical, or "economic," deferred tax asset (EDTA) should be equal to the present value of all future reversals of temporary differences,[2] multiplied by the current law tax rate applicable at each future reversal (less any provision for future non-recoverability of taxes if the company is not presumed to be in a fully taxable position in all future years in the time horizon). Present value calculations for these reversals should be at a post-tax interest rate, since the deferred tax asset is not itself a driver of income taxes.[3] See Section II below for the reasoning and purpose of this EDTA calculation. See Part IV of the attached "Analysis" for the EDTA calculation approach.

2) Final post-tax statutory income in a given period should equal the release of any margins in the reserve over the emerging experience, minus tax on that margin. Thus, for example, if the pre-tax margin equals $100, the final post-tax statutory book profit under current law should equal $65 if experience emerges as per the assumptions. Table I, below, gives a demonstration that the EDTA calculation method expressed in criterion 1) satisfies this criterion 2).

3) The tax expense for any financial period, i.e., current tax minus any [interest-effected] change in the theoretically appropriate deferred tax asset, should generally be equal to the tax rate (currently 35 percent) multiplied by the pre-tax statutory income for that period.[4] Table II, below, gives a demonstration that the EDTA calculation method expressed in criterion 1) satisfies this criterion 3).

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[2] Temporary differences are those differences between the statutory balance sheet values and tax basis balance sheet values that will eventually disappear. Examples where such temporary differences can exist are reserves and real estate depreciation balances.

[3] This is a departure from the statutory DTA, which does not discount such reversals at interest and thus does not take into account the length of time from the statement date to the year of the tax benefit of the reversal. Additionally, the statutory DTA is subject to certain severe regulatory limitations that many believe generally overstate a provision for non-recoverability of taxes.

[4] "Deferred tax asset" is taken in the illustrations herein and in the attached "Analysis" to mean the incremental DTA attributable to reserves and Tax DAC on the portfolio of business included in the particular PBR valuation. It is also recognized that restricting this definition to the reserves and Tax DAC and disregarding any other temporary differences is to some extent simplistic.

Throughout this paper we assume that the company is subject to federal income taxes at a rate of 35 percent in each year, has positive taxable income in all years and is a stand-alone entity for tax purposes.

II. Deferred Taxes

The predominant purposes of deferred taxes are to make the incidence of tax expenses more closely approximate the tax rate multiplied by pre-tax income and to improve the comparability of financial statements of different entities.

For example, two entities with the same pre-tax income and the same balance sheets unadjusted for deferred taxes can have markedly different future tax patterns—and thus markedly different true values to their owners. First, they may have very different current temporary difference inventories.[5] Moreover, even if their temporary difference inventories are equal, their future reversal patterns over time may be very different. The statutory deferred tax mechanism is the balance sheet approach to adjust for the difference in such temporary difference inventories. The EDTA will additionally adjust for any differences in the future reversal patterns, by virtue of including a present value aspect in its calculation.

The predominant portion of the statutory DTA with respect to a block of business will equal the statutory PBA reserve, less the tax reserve, and plus the current unamortized balance of the tax basis deferred acquisition cost (Tax DAC),[6] all multiplied by 35 percent, and decreased by certain, generally substantial, non-admissibility requirements.[7] There is no present-valuing at interest for statutory DTA reversals, so that a reversal of $100, 40 years from the statement date, has the same statutory statement value as a $100 reversal that occurs only two years from the statement date.

As a point of clarification, the tax incurred with respect to the Tax DAC, which some practitioners might equate to a premium tax, in fact differs substantially in concept from a premium tax in two respects:

- The tax incurred with respect to the Tax DAC is not tax-deductible.
- The tax incurred with respect to the Tax DAC is a "temporary difference expense" and thus is a driver of the deferred tax asset. Premium taxes do not result in material temporary differences.

[5] For example, one entity might have accelerated depreciation "for tax purposes only" on a real estate investment, for example, and will therefore have lower future tax deductions. Reserve temporary differences work in the same manner.

[6] As defined in Internal Revenue Code Section 848.

[7] Generally, the largest such mandated decrease is with respect to the portion of future reversals that take place beyond 12 months from the statement date. For the complete set of statutory deferred tax requirements, see the current NAIC Accounting Practices and Procedures Manual, Statement of Statutory Accounting Principles No. 10, "Income Taxes" (SSAP 10).

Theoretically, premium taxes should therefore be treated as an expense like other expenses, while the Tax DAC can be viewed mathematically as a modification of the tax reserve.

III. Conclusion

I therefore arrive at the following conclusion as to the theoretical statutory PBA reserve:

Step 1: Calculate the PBA reserve ignoring income taxes.

Step 2: Calculate the EDTA for the block of business, discounting future reversals at post-tax interest.

Step 3: Calculate the incremental effect, with respect to the block of business being valued, on the existing statutory DTA.

Step 4: The final PBA reserve equals:

Step 1 + Step 3 – Step 2.

This "balance sheet correction" approach (i.e., PBA reserve plus statutory DTA, minus EDTA) should provide the appropriate offset for the existing statutory DTA asset. The statutory DTA asset remains on the balance sheet as is. Put differently, this process calculates a pre-tax PBA reserve and effectively replaces the statutory DTA with the EDTA (if one looks at the statutory balance sheet taken as a whole) and provides for proper discounting for reversals that will occur years hence.

Below, in Table I, is a spreadsheet demonstration that, satisfies criterion 2) in Section I. That is, the final profit equals 65 percent of ε, where ε is the gross pretax profit margin.

Table I

Illustration of Effect of "Economic" Deferred Tax Asset

Investment Inc. Rate: 5.00% BFIT 0.952381
3.25% AFIT 0.968523
Profit.Mgn (ε): 2% of cash outflows

End of Cal Yr(t)	(1) Cash Flows	(2) Premium Element	(3) Tax DAC	(4) Res(t) (BFIT)	(5) Tax Reserve	(6) NTL(t)	(7) PV of Temp Differences	(8) EDTA(t)	(9) Book Profit [BP(t)] BP(t)	(10) = - 0.65*ε
0			-	310.99	279.89	279.89	(20.66)	7.23		
1	(10.00)	50.00	3.66	316.34	284.71	281.05	(25.52)	8.93	0.130	0.130
2	(20.00)	46.50	6.67	311.76	280.58	273.91	(28.91)	10.12	0.260	0.260
3	(24.00)	43.25	9.09	302.87	272.58	263.49	(31.38)	10.98	0.312	0.312
4	(28.80)	40.22	10.96	288.63	259.77	248.81	(32.84)	11.49	0.374	0.374
5	(34.56)	37.40	12.31	267.81	241.03	228.72	(33.18)	11.61	0.449	0.449
6	(41.47)	34.78	13.18	238.90	215.01	201.83	(32.24)	11.28	0.539	0.539
7	(49.77)	32.35	13.61	200.09	180.08	166.47	(29.83)	10.44	0.647	0.647
8	(59.72)	30.09	13.62	149.18	134.26	120.64	(25.71)	9.00	0.776	0.776
9	(71.66)	27.98	13.24	83.54	75.19	61.94	(19.61)	6.86	0.932	0.932
10	(86.00)	26.02	12.51	-	-	(12.51)	(11.16)	3.91	1.118	1.118
11			9.86	-	-	(9.86)	(8.88)	3.11	-	-
12			7.59	-	-	(7.59)	(6.89)	2.41	-	-
13			5.66	-	-	(5.66)	(5.19)	1.82	-	-
14			4.05	-	-	(4.05)	(3.75)	1.31	-	-
15			2.74	-	-	(2.74)	(2.56)	0.90	-	-
16			1.71	-	-	(1.71)	(1.61)	0.57	-	-
17			0.94	-	-	(0.94)	(0.89)	0.31	-	-
18			0.41	-	-	(0.41)	(0.39)	0.14	-	-
19			0.10	-	-	(0.10)	(0.10)	0.03	-	-
20			-			-	0	-	-	-

Shaded column is the demonstration that Book Profit =65% of ε .

Shaded column (10) demonstrates that the calculated statutory book profit (col (9)) equals 65 percent of the assumed profit margin. Interest rate (i), below is pre-tax.

Legend:

(1) Given

(2) Given

(3) Calculated independently from (2), using Code Section 848 rules for individual life insurance (i.e., capitalization rate of 7.7% on Col (2) premiums and the mandated 10-year amortization).

(4) $(4)_t = [(4)_{t+1} - (1+ \varepsilon)x(1)_{t+1}]/(1+i)$

(5) Given.

(6) $= (5)_t - (3)_t$.

(7) $= [(7)_{t+1} + (4)_{t+1} - (4)_t - (6)_{t+1} + (6)_t]/(1+.65i)$

(8) $= - 35\% \text{ x } (7)_t$.

(9) $= - (4)_t + (.65)x(1)_t + (1+i)x(4)_{t-1} - (.35)x(i)x(4)_{t-1} + (8)_t - (1+.65i)x(8)_{t-1} + .35x[(6)_t - (6)_{t-1}]$

(10) $= (-2\%) \text{ x } (.65)x(1)_t$.

Table II, below, is a demonstration that satisfies criterion 3) in Section I. That is, the annual tax expense, defined as current tax plus the interest-effected change in the EDTA, equals exactly 35 percent of the pre-tax statutory book profit.

Table II

Cal Yr	(A) Pre-Tax BP(t)	(B) Tax Expense	(C) =(A)-(B)	(D) =(B)/(A)
1	0.200	0.070	0.130	35.00%
2	0.400	0.140	0.260	35.00%
3	0.480	0.168	0.312	35.00%
4	0.576	0.202	0.374	35.00%
5	0.691	0.242	0.449	35.00%
6	0.829	0.290	0.539	35.00%
7	0.995	0.348	0.647	35.00%
8	1.194	0.418	0.776	35.00%
9	1.433	0.502	0.932	35.00%
10	1.720	0.602	1.118	35.00%
11	-	(0.000)	0.000	
12	-	(0.000)	0.000	
13	-	0.000	(0.000)	
14	-	0.000	(0.000)	
15	-	0.000	(0.000)	
16	-	(0.000)	0.000	
17	-	0.000	(0.000)	
18	-	(0.000)	0.000	
19	-	0.000	(0.000)	
20	-	(0.000)	0.000	

Table II Legend (numerical columns refer to Table I):

Column	Formula Description
A	$= - (4)_t + (1)_t + (1+i) \times (4)_{t-1}$
B	$= (.35) \times (1)_t + (.35i) \times (4)_{t-1} - (8)_t + (1+.65i) \times (8)_{t-1} -.35 \times [(6)_t - (6)_{t-1}]$

The attached "Analysis" goes beyond the above demonstrations to give algebraic proofs that the criteria in Section I are satisfied.

IV. Remaining Issues and Concerns

It could be alleged that it is not appropriate to effectively violate the SSAP 10 rules on statutory DTAs by employing implicit reserve methodology that in effect replaces it with a more realistic EDTA. On the other hand, current thinking appears to be that the SSAP 10 constraints are far harsher than what realistic non-recoverability provisions would be. As an example, reserve differences and tax DAC amounts typically take 10 to 20 years to reverse. If only the next 12 months are captured in the statutory DTA, you could have the following situation:

	Company A	Company B
Tax Reserve	100	90
Statutory Reserve	$100	$100

In this simplified example, it is clear that Company A will have $10 more future taxable income than Company B. Given that reserve and Tax DAC temporary differences take a long time to reverse, if the DTA only reflects the next 12 months of temporary difference reversals, the predominant portion of such reversals will not be counted, and a primary purpose of PBA will be compromised.

Because taxes are a significant issue in the development of reasonably realistic reserve levels, and because tax reserves are driven to a great extent by statutory reserve methodology, practical applications of the theoretical conclusions of this paper need to be addressed. For example, the allocation of the DTA/EDTA difference to individual contracts or blocks of business needs to be considered.

Analysis

This Analysis is divided into four Parts:

Part I shows the anomaly caused in current statutory income if the PBA reserve were to be calculated on a post-tax basis.

Part II shows that, at zero interest, if the reserve exactly provides for future pre-tax cash flows, statutory book profit equals zero.

Part III is identical to Part II, except that an explicit profit margin was assumed in the reserve. That is, the reserve assumptions were set to produce sufficient monies that, together with future asset fees and/or future premiums, pay all pre-tax costs (benefits plus expenses), plus delivery of a profit margin to the company. At zero interest, statutory book profit equals that margin minus the tax rate thereon (i.e., book profit equal to 65 percent of the margin under current law).

Part IV combines the existence of an explicit margin and the effect of interest. Here again, final statutory book profit equals that profit margin minus the tax rate thereon (i.e., 65 percent of that margin). Note that the PBA reserve "proper" uses pre-tax interest and pre-tax claims, while the EDTA(t) is discounted at post-tax interest. That is, EDTA(t) equals the present value of reversals of temporary differences,[8] multiplied by the tax rate, and discounted at a post-tax interest rate.

Part I: Anomalous Effect of Including Taxes in PBA Reserve

Definitions (at t^{th} anniversary from statement date):

CF(t)	Positive cash flows, ignoring taxes and excluding investment income on the prior reserve. Assume CF(t) occurs at end of year.
Res(t)	PBA Reserve, assume prudent best estimate assumptions, that experience emerges per the reserve assumptions
DTA(t)	Statutory deferred tax asset[9]
BP(t)	Book profit
NTL(t)	Net tax basis liability (in this case, Tax Reserve minus tax DAC)
v	1/(1+i) where i = investment income rate after tax (AFIT).
n	Number of years from statement date to expiry of portfolio.

If we were to include the effect of taxes in the PBA reserve itself, the following would result:

[8] "Temporary Difference" is defined simplistically in this document as the statutory reserve minus the tax reserve plus the Tax DAC unamortized balance, where the Tax DAC is the tax basis capitalization amount under IRC Section 848. Other deferred tax assets and liabilities are ignored.

[9] A true "Economic" DTA will be used in Part IV, below. We will use the symbol "EDTA(t)" for that.

$$Res(t) = \sum_{S=t+1}^{n} (v^{S-t}) \times [- CF(s)\times(1-.35) + (NTL(s-1) - NTL(s))\times.35].$$

Thus, $Res(t-1) = (v)\times\{- CF(t)\times(1-.35) + (NTL(t-1) - NTL(t))\times(.35) + Res(t)\}$ (1)

$$BP(t) = Res(t-1)\times(1+i) + (.65)\times CF(t) + (NTL(t)-NTL(t-1))\times(.35) - Res(t) + DTA(t) - DTA(t-1) \quad (2)$$

But, per (1), $Res(t-1)\times(1+i) - Res(t) = - (.65)\times CF(t) + (NTL(t-1) - NTL(t))\times(.35)$ (3)

Therefore, $BP(t) = DTA(t) - DTA(t-1)$.

This is *not* an appropriate result. At zero interest and fully admissible DTA values, BP(t) should equal zero under these assumptions.

Part II: Appropriateness of Excluding Taxes from PBA Reserve Cash Flows (Other than Investment Income Cash Flows) when Experience Emerges Equal to Reserve Assumptions

$Res(t) = \sum_{S=t+1}^{n} (v^{S-t}) \times [- CF(s)]$. Note, however, that i is still an AFIT rate, for readability and convenience at the moment.

Correspondingly, $Res(t-1) = (v)\times [-CF(t)) + Res(t)]$.

$$BP(t) = Res(t-1)\times(1+i) + (.65)\times CF(t) - Res(t) + DTA(t) - DTA(t-1) - (.35)\times(NTL(t-1) - NTL(t)). \quad (4)$$

But, $DTA(t) - DTA(t-1) = .35\times[Res(t) - NTL(t) - Res(t-1)+NTL(t-1)]$, (5)

and

$$Res(t-1)\times(1+i) - Res(t) = -CF(t) \quad (6)$$

Substituting (5) and (6) into (4), we get:

$$BP(t) = -.35\times CF(t) + .35\times[Res(t) - NTL(t) - Res(t-1)+NTL(t-1)] - .35\times(NTL(t-1) - NTL(t))$$

$$= (.35)\times[Res(t) - Res(t-1) - CF(t)]. \quad (7)$$

Thus, at zero interest (which is the way statutory fully admissible DTAs are calculated), and under experience equal to the PBA assumptions, formula (7) will equal zero.

Part III. Identical to Part II, Except that an Explicit Margin (ε) Exists in the Reserves

$$BP(t) = Res(t-1)\times(1+i)+(.65)\times CF(t)-Res(t)+DTA(t)-DTA(t-1)-.35\times[NTL(t-1)-NTL(t)] \quad (8)$$

But now, Res(t-1)x(1+i) – Res(t) = -CF(t)) + ε .

Therefore, BP(t) = - CF(t) + ε + (.65)xCF(t) + .35x[Res(t) – NTL(t) – Res(t-1)+NTL(t-1)]
- (.35)x[NTL(t-1) – NTL(t)]. (9)

= -(.35)xCF(t) + ε + .35x[Res(t) - Res(t-1)] (10)

But, Res(t) – Res(t-1) = CF(t)- ε + (i)x(Res(t-1). (11)

Putting (11) into (10), and at *zero* interest, we get:

BP(t) = -.35x(CF(t) + ε + .35x[CF(t) - ε] = (.65)x(ε), a logical result.

IV. Calculation of an "Economic" DTA (as Opposed to a Statutory DTA)

For a true economic effect,[10] it is necessary to account for interest discounting in the PBA reserve, which statutory deferred taxes do not do. On the other hand, statutory deferred taxes contain some severe constraints for admissibility, which could offset the lack of interest discounting. In any case, for those two reasons statutory deferred taxes generally do not represent a reasonable economic picture.

We need to define the "economic" deferred tax asset (EDTA(t)). It captures the temporary differences from both "tax reserves versus statutory reserves" and the tax DAC. Additionally, the interest rate (***i***) has been changed to be pre-tax (BFIT) in order to include all relevant terms.

$$EDTA(t) = -(.35) \times \sum_{S=t+1}^{n} (w^{S-t}) \times [Res(s) - Res(s-1) - (NTL(s) - NTL(s-1))],$$

where w= 1/(1+.65i).

It is obvious that, at zero interest, EDTA(t) becomes (.35)x[Res(t) – NTL(t)], which equals the formula for a fully admissible statutory DAC. From the above:

(1+.65i)xEDTA(t-1) = - (.35)x[Res(t) – Res(t-1) – (NTL(t) –NTL(t-1))] + EDTA(t) (12)

Substitution of the EDTA in place of the DTA should provide the proper economic result when combined with the PBA reserve illustrated in Part III, as shown below:

BP(t) = Res(t-1)x(1+i) + (.65)xCF(t) – (.35i)xRes(t-1) – Res(t) + EDTA(t)
– EDTA(t-1)x(1+.65i) – (.35)x[NTL(t-1) – NTL(t)]. (13)

[10] "True economic effect" is herein defined (assuming full future tax recoverability) as:
- Conforming the tax expense to the tax rate multiplied by the profit margin, and
- For the final net book profit AFIT to equal the gross profit multiplied by the tax rate.

But, $Res(t) - (1+i)xRes(t-1) = CF(t)- \varepsilon.$ (14)

Substituting (12) and (14) into (13), we get:

$$BP(t) = - (.35)xCF(t) + \varepsilon - (.35i)\,x(Res(t-1)) + .35x[Res(t) - NTL(t) - Res(t-1)+NTL(t-1)] - (.35)x[NTL(t-1) - NTL(t)] \quad (15)$$

$$= - (.35)xCF(t) + \varepsilon - (.35i)\,x(Res(t-1)) + .35x[Res(t) - Res(t-1)] \quad (16)$$

$$= - (.35)xCF(t) + \varepsilon + (.35)x[(Res(t) - (1+i)xRes(t-1)]$$

$$= -(.35)xCF(t) + \varepsilon + (.35)x[CF(t) - \varepsilon]$$

$$= (.65)x(\varepsilon).$$ QED