ACTUARIAL RESEARCH CLEARING HOUSE
1990 VOL. 2

AFTER-TAX PRESENT VALUE IN DIVORCE PENSION VALUATIONS

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Abstract

This paper describes a method for computing after-tax present value in divorce pension valuations. In some cases the after-tax present value is not radically different than the pre-tax present value. However, it can be. The differences are most notable for divorces of the old or very young, and divorces where there is a deferred pension. It is noted that at least two tax rates are involved, rather than one, and that in some circumstances, the after-tax present value can substantially exceed the pre-tax present value.

AFTER-TAX PRESENT VALUE IN DIVORCE PENSION VALUATIONS

In divorce property settlements, actuaries are sometimes asked to compute the present value of a retirement annuity. Courts use such present values to divide assets in an equitable fashion. If, however, the court uses the present value to offset assets on which taxes have already been paid, the actuary should also be computing an after-tax present value.

There are several approaches to an after-tax present value. For the first imagine (for descriptive simplicity) that we have a male retiree and that the court, in effect, is trying to give his ex-spouse an income stream after <u>her</u> taxes which will equal the retiree's income stream after <u>his</u> taxes.

The formula for giving this present value after taxes, PVAT, for a retiree age x is given by

$$PVAT = (1-t_1)\ A\ (1 + {}_1p_x v + {}_2p_x v^2 + \ldots) \qquad [1]$$

where t_1 = the tax rate of the person receiving the annuity
t_2 = the tax rate of the person receiving the lump sum
$v = \dfrac{1}{1+i(1-t_2)}$
A = the annual retirement benefit, before taxes
i = the interest rate

We can think of the left side of the equation as being comprised of a number of separate amounts. The after-tax earnings of each of these amounts would be exactly sufficient to pay for one the retiree's future after-tax payments. Note that the spouse pays taxes on her earnings at her tax rate. So the full amount of her income is not available for compounding.

This turns out to be a rather simple computation. If we compute an intermediate present value, PVI, using a modified interest rate $i'=i(1-t_2)$, then the after-tax present value is given simply by $PVAT=(1-t_1)PVI$.

Another approach to the same problem is to ask how much the retiree would have to have now to yield his after-tax income stream. This approach gives a different present value. In this case the retiree would pay the tax on the interest payment. We can still use the above equation. However, t_2 would be the retiree's tax rate for purposes of accumulation. In the simplest situations t_2 would equal t_1.

A third approach is to ask what after-tax lump sum would be necessary to equal the retiree's before-tax stream of payments. However, this approach is clearly inequitable, as may be seen from the following example. Suppose a retiree's payment stream consists of one and only one payment, which is due immediately

after his divorce settlement and upon which he must pay taxes. Then the retiree would receive $(1-t_1)$ times what the spouse would receive.

A variant of the first two approaches is to present value the retiree's before-tax income stream, while simultaneously inflating the offsetting (and previously taxed) assets to a pre-tax level. This approach leads to a slightly different result.

Before discussing this variant let us consider which of the first two approaches seems preferable. To clarify matters we can think of there being two after-tax present values; the retiree's share present valued using his tax rate for t_2 and the spouse's share present valued using her tax rate for t_2. Were it not for the legal and administrative complexities, we could imagine either party exchanging his or her share for a lump sum on which taxes had already been paid.

Conceptually, both approaches divide each pension payment at point of receipt, after payment of the retiree's taxes represented by t_1. In the first approach the retiree buys the spouse's share with the present value (to her) of her share. But if the retiree's tax rate is higher than the spouse's, he should be willing to pay as much as his present value, using his tax rate on the interest payments. This is the second approach. Presumably the retiree and spouse should be willing to split the difference. So a reasonable division would be an average of the two after-tax present values: one with t_2 equal to the spouse's tax rate, one with t_2 equal to the retiree's tax rate. This average will be called the fourth approach.

By averaging the two after-tax present values we are not necessarily assuming a 50/50 division of the pension asset. Rather we are assigning a value to the entire pension asset. The value of part of the pension asset would be done in the same way, by giving equal weights to two present values. The value of a part is, however, proportional to the whole. So there should be no need to compute a separate valuation of the part.

Giving equal weights to the two present values is somewhat arbitrary. However, it is a reasonable result when the asset is worth more to one party than to the other. It is hard to imagine a judge who understood the issue doing otherwise.

In a variant of the fourth approaches we could set t_1 and t_2 to the retiree's tax rate when the computing the present value to the retiree and t_1 and t_2 to the spouse's tax rate when computing the present value to the spouse. This has the same effect on the overall division of assets as elimanating t_1 from equation [1] and dividing the offsetting assets by $(1-t_1)$. So the result from one party's point of view is the same as dividing the annuity distributions before taxes while simultaneously inflating the previously taxed assets to a pretax value.

This approach, the fifth approach, has an advantage when computing the present value to the spouse, in that it does not penalize the spouse if the retiree has a tax rate higher than her own. What we're doing in the spouse's part of the fifth approach is imagining that the spouse receives the retired pay and pays the taxes on it. We, in effect, find the point(ignoring other considerations), where the spouse would be indifferent to whether she received the annuity or the lump sum. A similar determination is made in the retiree's part of the fifth approach.

This approach is consistent with current tax law(1), since the annuity could be taxable only to the spouse under an allocation. It is preferable to the fourth, in the author's opinion, because it treats both parties equally. If the law were changed so that only the retiree could pay the taxes(and the spouse received a tax-free payment), then the fouth approach would make more sense. The difference is in what the spouse gives up in choosing the lump sum.

The remainder of this paper will use the fifth approach. As it turns out, the fourth and fifth approaches are not radically different. In the tables that follow the fifth approach gives values approximately 5% higher than the fourth approach, assuming a retiree tax rate of 28% and a spouse tax rate of 20%. To reiterate, PVAT in the fifth approach is determined in equation [1] first with t_1 and t_2 set to the retiree's tax rate. Next PVAT is determined with t_1 and t_2 set to the spouse's tax rate. Finally the two values of PVAT are averaged.

Before moving on it may be helpful to summarize all the approaches considered so far. They are summarized in the table below by giving different values for the tax rates in equation [1]. Also shown are some inappropriate combinations of the tax rates.

Table 1
Summary of Approaches to After-tax Value

Tax Rates t_1	Tax Rates t_2	Comment
retiree	spouse	Approach 1..... } Av.= Approach 4
retiree	retiree	Approach 2..... } Av.= Approach 5
spouse	spouse	Intermediate value
0	0	Approach 3, often used but inequitable
retiree	0	Sometimes used, but inequitable*
spouse	0	Not used, and inequitable*
0	retiree	Sometimes used, but not appropriate
0	spouse	Not used and not appropriate
spouse	retiree	Not used and not appropriate

* Zeroes for t_2 are appropriate as a part approaches 4 or 5 if the person assumed to receive the lump sum would have a tax-free income from the lump sum. If the lump sum represents equity in a house, then the savings in rent should probably be considered tax-free income.

The following tables show the effect of the fifth approach. They give the ratios of after-tax present values to pre-tax present values. The tables were constructed using the unloaded male 1983 Group Annuity Amortality Table(2), and an interest rate of 8%.

Table 2
Ratios of After-Tax Present Value to Pre-Tax Present Value
Assuming No Cost-of-Living Increases

	Ratio by Retiree and Spouse Tax Rates*			
	Retiree	Spouse	Retiree	Spouse
Age of Retiree	.28	.28	.28	.28
20	.96		.96	
30	.94		.95	
40	.92		.93	
50	.89		.91	
60	.86		.88	
70	.82		.85	
80	.79		.82	
90	.76		.80	
100	.75		.78	

*Assumes 8% interest and uses the unloaded male 1983 Group Annuity Mortality Table and fifth the approach for after-tax present value.

Table 2 shows the ratio almost reaching $(1-t_1)$ for 100 year old retirees. The ratio is higher for younger retirees. This is as we would expect, since the after-tax present value uses a lower effective interest rate, i', than used in computing the pre-tax present value. The more distant terms are consequently discounted less heavily than with the pre-taxed present value.

Table 3 shows the effect of a cost-of-living adjustment. In this case the equation is as follows:

$$PVAT = (1-t_1)\ A\ (1 + {}_1p_x(1+c)v + {}_2p_x(1+c)^2 v^2 + \ldots) \qquad [2]$$

where c = the annual cost-of-living adjustment and other terms are identical to those in equation [1]

When the rightmost terms in equation 2 are sufficiently large the present value after taxes can exceed the present value before taxes (PVBT). In effect, the importance of the tax shelter becomes more important than the taxes at receipt. This is shown in Table 3 below age 40, where the ratios exceeds one.

Table 3

Ratios of After-Tax Present Value to Pre-Tax Present Value
Assuming A Cost-of-Living Adjustments of 5%

	Ratio by Retiree and Spouse Tax Rates*			
	Retiree	Spouse	Retiree	Spouse
Age of Retiree	.28	.28	.28	.20
20	1.20		1.17	
30	1.12		1.10	
40	1.04		1.04	
50	.97		.98	
60	.90		.92	
70	.85		.87	
80	.80		.83	
90	.77		.80	
100	.75		.78	

*Assumes 8% interest and uses the unloaded male 1983 Group Annuity Mortality Table and uses the fifth approach for after-tax present value.

If we compare the individual terms of equation [2], where $t_2 = t_1 = .28$, with those of PVBT, then at year 16 it happens that

$$\frac{1}{1.08}^{16} < (1 - .28)\left[\frac{1}{1 + .08(1 - .28)}\right]^{16}$$

As a consequence the PVAT terms will exceed the PVBT terms beginning with the 17th year. Thus it is possible for the ratios in Table 3 to exceed 1.

The situation is more extreme for deferred annuities. In this case, the early terms have little or no importance. This is shown in Table 4 and 5 for annuities deferred until the annuitant reaches age 65. Table 4 has no cost-of-living adjustment, while Table 5 does.

Table 4

Ratios of After-Tax Present Values to Pre-Tax Present Values for an Annuity Deferred to Age 65 Assuming No Cost-of-Living Increases

	Ratio by Retiree and Spouse Tax Rates* Retiree/Spouse Tax Rates	
Age of Retiree	.28/.28	.28/.20
20	2.15	1.95
30	1.74	1.62
40	1.41	1.35
50	1.15	1.13
60	.93	.94
65	.84	.86

*Assumes 8% interest, uses the unloaded male 1983 Group Annuity Mortality Table, and uses the fifth approach for after-tax present value.

Table 5

Ratios of After-Tax Present Values to Pre-Tax Present Values for An Annuity Deferred to Age 65 Assuming A Cost-of-Living Adjustment of 5%

	Ratio by Retiree and Spouse Tax Rates*			
	Retiree	Spouse	Retiree	Spouse
Age of Retiree	.28	.28	.28	.20
20	2.24		2.02	
30	1.82		1.68	
40	1.47		1.40	
50	1.20		1.17	
60	.97		.98	
65	.87		.89	

*Assumes 8% interest, uses the unloaded male 1983 Group Annuity Mortality Table, and uses the fifth approach for after-tax present value.

Some of the ages in Tables 2-5 have little divorce. Others have *no pension assets to speak of*. There are others, however, where divorce is common, pension assets sizeable, and the weighted PVAT to PVBT ratio is substantially different from one. It is surprising then that after-tax present values are rarely used in divorce pension valuations. It was mentioned in none of the reference (3-7) and some of these sources are quite sophisticated about other aspects of tax consequences.

One source (8) where this problem was discussed cited four cases. Three of the cases (9) did not use after-tax present values, reasoning that the future tax rates of individuals were

too speculative to consider. In the fourth case (10) it was ruled that future taxes reduce the present value of the plans.

Snyder(11), who has performed numerous divorce pension valuations, recognizes there is an equity issue. As a practical matter, however, he uses only pre-tax present values, presumably because of the legal cosequences of not doing so. He mentions one case where the trial court granted a 10 percent allowance for taxes(when 35 percent was requested), but even this was overruled on appeal. Again the legal reasoning was that future tax rates were too speculative to consider.

The difficultly with this legal reasoning is that it implicitly assumes a tax rate of zero. This is not a very likely forcast and even a crude estimate would yield a more equitable result.

Future tax rates are, of course, speculative. But setting assumptions for mortality, interest rates, and benefit levels is also difficult. Tables 2-5 demonstrate, I believe, that the tax effects are too large to ignore.

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