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Actuarial Assumptions for Pension Plans Invite Arbitrage
The Case of Pension Obligation Bonds

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The following is an extract from a larger essay that argues that the use of actuarial discount rates that incorporate equity risk premiums[1] systematically misstates pension plan periodic costs when the liability cash flows are independent of the equity market portfolio. This systematic error favors the present generation of taxpayers over future generations and favors participants over taxpayers. Such mispricing encourages more sophisticated market participants to invent transactions designed to extract value. One such transaction developed in the late 1980s in the public plan sector is the issuance of pension obligation bonds (POBs).

Pension obligation bonds claim to be able to reduce the cash flow from a municipality in support of its pension fund by taking advantage of the assumed discount rate used by the plan's actuary — an investment bank has described its POB proposal as "arbitraging the actuary." Anand (2/3/97) refers to "the arbitrage between what Ms. Whitman's [New Jersey Governor Christine Todd Whitman] administration anticipates paying bond purchasers and what it hopes to earn through the pension funds' investments"

Suppose:
$\bar{r}$ = risk free rate of return
c = municipal rate of borrow on taxable debt
$\bar{e}$ = actuarial discount rate based on the plans usual asset allocation including equities.
$r < c < \bar{e}$

The idea is for the municipality to borrow by issuing taxable POB's (the IRS has ruled POBs cannot be tax-exempt), placing the proceeds in the pension plan where they "fund" a previously unfunded liability that was being amortized as part of the plan's annual cost.

Suppose an unfunded liability of $1 is being amortized over n periods in level dollar amounts. The actuary would compute the amortization cost as:

$$\frac{1}{a\underset{n|}{\overline{}}@\bar{e}} = \frac{\bar{e}}{1-(1+\bar{e})^{-n}}$$

The municipality issues an n-year POB with a $1 principal and a self-amortizing repayment of:

$$\frac{1}{a\underset{n|}{\overline{}}@c} = \frac{c}{1-(1+c)^{-n}}$$

The $1 proceeds of the issue are placed in the plan to "satisfy" the previously unfunded liability and invested in accordance with the plan's usual asset allocation. The actuary eliminates the amortization charge from the current cost. The municipality now pays the debt service instead of the amortization charge, a "saving" to the municipality of:

$$\frac{\bar{e}}{1-(1+\bar{e})^{-n}} - \frac{c}{1-(1+c)^{-n}} > 0$$

Note that when n = 1, the above reduces to: $\bar{e} - c > 0$.

The process outlined may be divided into two processes that, taken together, have the identical financial substance as the original process:

- The pension plan locates within its portfolio a subportfolio of Treasury securities with a market value of $1 and with cash flows exactly proportionate to the amortization schedule of the proposed POBs.[2] It sells this portfolio and invests the proceeds in accordance with the plan's usual asset allocation.
- The municipality issues the POBs and places the $1 proceeds in the pension fund where the $1 is used to repurchase the Treasury subportfolio sold above.

This deconstruction shows that the first step is a swap or an asset reallocation whose risk-adjusted value is zero. This is as simple as the recognition that $1 in bonds has the same value as $1 in stocks. Their divergent expected future values are exact compensation for their differential risk. The second step constitutes a borrowing by the municipality at its borrowing rate, c, for the purpose of investing in Treasury securities with a rate r. With c > r, the differential periodic cash flow equals

$$\frac{c(1+c)^{n}}{(1+c)^{n}-1} - \frac{r(1+r)^{n}}{(1+r)^{n}-1} > 0$$

which equals c − r for n = 1 and for very large values of n and is somewhat less for intermediate n. The two steps taken together make it clear that the POB process amounts to an asset reallocation that could be done independently of the

bond issuance coupled with a borrowing at rate c in order to invest at rate r.

The market assigns the higher borrowing rate, c, to the municipal debt because holders of this debt face a greater risk of default or "a debt-service moratorium" [3] than do holders of Treasury debt. There are two ways to look at the debt-for-debt transaction:

- If the municipality deems its promise (the unfunded liability) to the pension plan to be without risk to the plan (clearly a view somewhat at odds with the market debt rate assignments), then the transaction is simply a money loser.
- If the municipality agrees with the market that its promise is not as good as the Treasury promise, then the debt-for-debt transaction amounts to a defeasance in favor of the plan and its participants, and the net cost of the defeasance, (c-r) annually, is an additional benefit to plan participants paid for by the taxpayers.

Note that, if the municipality could issue tax-exempt POBs at a rate c' < r, then a true arbitrage could be effected. It is just this reasoning that led the IRS to rule that POBs are taxable bonds.

An unsigned editorial, *Pensions and Investments* (3/3/97), warns: "Gov. Christine Todd Whitman's plan to issue $2.9 billion in pension obligation bonds is good news for participants…. The state, and taxpayers should view the pension obligation bonds more cautiously…".

Earlier in the decade, Los Angeles County debated the merits of POBs. During the debate, the actuarial rate remained unchanged. As the rates that would be required to sell the POBs rose, the proponents argued that the delays were costly to the county. "In October 1992, issuing the pension obligation bonds would have saved the county an estimated $519 million [over 20 years]. By February 25 of this [1994] year,

interest rate increases shrunk potential savings to $318 million. By March 10, higher interest rates had reduced the estimated savings to $240 million, [according to a plan trustee]." Hemmerick (4/18/94). This article exposes many of the political consequences arising from the use of an actuarial discount rate that is not risk-adjusted. Hemmerick (7/25/94) shows the county bargaining position weakening through the delay, and the trustees demanding additional concessions from the county.

In an exchange of "Commentary" (Surz, 4/4/94) and "Letters" (Stoufer, 5/30/94, Surz, 6/13/94), Mr. Surz, with a technical error later corrected by Mr. Stoufer, gets the substantive issues correct and concludes: "My basic premise still stands. POBs are advocated by those who benefit from them — underwriters, investment managers, consultants, and beneficiaries. From whence does this benefit derive? It's paid by taxpayers, who clearly lose as they are bilked into buying off on bogus arbitrage arguments."

In the *Pittsburgh Post-Gazette*, 1/18/98, Brian O'Neill writes: "I'm asking (a friend who knows about high-finance) about the city selling $250 million in bonds to bail out its pension fund, asking if it's a good idea for taxpayers, when he offers eight words of solace I'll never forget: 'If we're really stupid, we're not uniquely stupid.'"An Internet search indicates recent POB activities in Massachusetts, Connecticut, and Georgia along with an unending river of POBs in California.

There is a simpler burlesque of the POB phenomenon that contains all the financial substance of the claimed POB advantages: Suppose a state government issues $1 billion of 30-year bonds promising to pay 6% interest and then takes $500 million of the proceeds and puts it into an account where it is invested in equities. Since the expected return on the $500 million of equities is sufficiently

high to meet all of the bond payments, the state spends the remaining $500 million immediately as it pleases. An actuary says he believes that the assets are sufficient to meet the liabilities and cites ASOP 27 in support of his position.

The fundamental point is this: the persistent use of expected returns in actuarial models involving risky assets ignores 40 years of financial economics and exposes taxpayers to manipulations by those who are more sophisticated about securities markets.

References

1) Anand, V., "Pension Bonds to Help N.J," *Pensions and Investments,* 2/3/97
2) Editorial (Unsigned), "A Pension Arbitrage," *Pensions and Investments,* 3/3/97
3) Hemmerick, S., "Los Angeles Bond Offering Likely to be Dead," *Pensions and Investments,* 4/18/94
4) Hemmerick, S., "L. A. County Eyes Bonds," *Pensions and Investments,* 7/25/94
5) O'Neill, B., *Pittsburgh Post-Gazette,* 1/18/98
6) Stoufer, J., "Letters," Pensions and Investments, 5/30/94; Surz, R. J., "Commentary," *Pensions and Investments,* 4/4/94
7) Surz, R. J., "Letters," *Pensions and Investments,* 6/13/94

Footnotes

1) In accordance with ASOP 27.
2) If, as is likely, such bonds cannot be found, many equivalent alternatives can be constructed using swaps or futures contracts. The important point here is that a large, liquid pension fund with substantially deferred cash outflows can effectively borrow at or near the Treasury borrowing rate.
3) Mid-1970s euphemism for default by New York City.

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