# Bond Case Briefs

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## How to Value Tax-Exempt Liabilities.

Discounting is the most common calculation in municipal finance. A rather mundane use of discounting is to convert bond prices into yields.

Significantly more important is assessing today's worth of future cash flows. It makes sense to report the benefit of a refunding transaction by summing the present values of future savings, rather than adding up undiscounted savings – the latter would surely overstate the true benefit.

In spite of its importance, the actual choice of the discount rate receives little attention in municipal finance. This is evident from the terminology: for starters, instead of a single discount rate, we should be referring to the term structure of discount rates. Provided that long-term rates are higher than short-term rates, distant cash flows should be discounted at higher rates than those nearby. An unfortunate custom in municipal finance is to discount every cash flow with the same rate, namely by the yield of the refunding issue.

This underestimates the worth of nearby savings, and overestimates that of savings in the distant future.

But let's leave the discussion of the term structure of interest rates to another day, and assume the yield curve is flat. However, even under this simplification, we are confronted with another question: should we really discount tax-exempt cash flows with a tax-exempt rate? Using a tax-exempt discount rate certainly seems reasonable. But consider a municipal issuer which has both taxable and tax-exempt bonds outstanding.

With the issuance of taxable bonds for advance refunding, this situation is becoming fairly common. To keep matters simple, assume that the bonds are optionless, and identical in all other respect. The market values of these bonds would certainly differ, depending on the tax considerations of the respective investors. However, we are considering these bonds from the perspective of the municipal issuer.

The cash flows generated by identical taxable and the tax-exempt bonds are unquestionably identical. Therefore, the present values of the cash flows generated must also be the same. **So the discount rate applicable to the cash flows should also be the same.** The question is whether this discount rate should be based on the issuer's taxable or tax-exempt borrowing rate.

In a co-authored paper with Bruce Tuckman "Subsidized Borrowing and the Discount Rate" – in the Winter 1999 issue of the Municipal Finance Journal, we argue that **the discount rate should be based on the municipality's taxable borrowing rate**. The core of the rationale is that because the taxable rate is unconstrained, excess cashflow can be invested at that rate. In contrast, the subsidized tax-exempt rate is applicable only to tax-exempt borrowing.

The taxable discount rate correctly determines the market price of a taxable bond, and underestimates the market price of a tax-exempt bond. Consider a 2% 10-year tax-exempt bond selling at par, when the issuer's taxable rate is 3%. The PV of the 2% bond at a 3% discount rate is

91.42%. The 8.58% difference between the par market value and the municipal issuer's 91.42% liability is a **measure of the federal subsidy**. This approach can be applied to the municipality's entire portfolio of liabilities, to determine its present value. A caveat is to use the term structure of discount rates, rather than a single discount rate, as in the example above.

More generally, using the "taxable discounting" approach we can estimate the aggregate subsidy granted by the federal government to issuers of tax-exempt bonds. According to a back-of-t-e-envelope calculation currently the federal subsidy is roughly $500 billion.

As discussed above, issuers should use their taxable borrowing rate to discount the cash flows generated by their tax-exempt liabilities. But how should callable tax-exempt bonds be handled? In that case the value of the underlying cash flows depends on the taxable rates, while the value of the call option depends on the tax-exempt rates. This is a thorny problem that we plan to address in the future.

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