

Price Volatility on Tax-Free Municipal Bonds

- Taxes matter when considering the price volatility on tax-free municipal bonds
- Taking taxes into account cushions the amount of expected price decline for a movement up in interest rates
- Ignoring taxes can lead to what some might think are nonsensical results
- There is not a single right tax rate to assume but we should focus on what we know

Have you ever wondered why the price volatility you see on tax-free municipal bonds is less than comparable taxable bonds? At Vining Sparks, we consider taxes when measuring interest rate risk on tax-free municipal bonds. The rationale is simple: taxes matter. Have you ever bought a tax-free municipal and *not* considered your tax-equivalent yield? Below we look at the implications of ignoring taxes and why we think it makes sense to consider them.

What are we measuring?

It is important to remember the core purpose of looking at price volatilities in the first place. The intent is to measure the price impact a change in the level of interest rates would have on a security. Practically, this is done by holding a spread constant (nominal, Z, OAS) and applying it to a shocked benchmark curve and solving for a price. Will spreads really remain constant? Perhaps they will, perhaps they won't — remember the intent of the exercise though, measuring the change in price due to a change in interest rates, *not* spreads changing (also known as basis risk). So holding spreads constant makes sense in this context. As an aside, I do find it acceptable to use interest rate shocks as an estimate of spread shocks *except* in the case of variable-rate securities.

Taxable Bond Example

Before we consider a tax-free security, let's consider a taxable example. For the sake of example, we will use the current 10-year Treasury which has a coupon of 1.25%. It is priced in the base case to yield 1.35%. If the curve were to shift +300 bps that would imply the Treasury would need to yield 4.35% which would result in a price of \$75.08 or a decline of 24.2%.

Curve Shift	Yield	Price	% Px. Chg
0	1.35	\$ 99.07	0.0%
100	2.35	\$ 90.25	-8.9%
200	3.35	\$ 82.28	-16.9%
300	4.35	\$ 75.08	-24.2%

Tax-Free Bond Example: Ignoring Taxes

Sometimes it is helpful to understand why we ought to do something by considering what happens if we don't. In the table below, we apply the same methodology for a taxable bond, while ignoring taxes, on a tax-free municipal. We assume a 10-year tax-free municipal bond with a coupon of 3.00% priced to yield 1.10% in the base case. This translates to a nominal spread to the 10-year Treasury of -25 bps. If we hold this spread constant and shock the curve, you'll notice the price change is very similar to the Treasury above. However, if we assume a tax rate of 31%

and consider what these scenario prices imply about the tax-equivalent yield and spread, it makes less sense. Effectively, it results in spreads, taking taxes into account, drastically widening as rates increase.

10-Year Tax-Free Municipal (Ignoring Taxes)

Curve Shift	Yield	Price	% Px. Chg	Spread (bps)	TE Yield*	TE Spread
0	1.10	\$ 117.95	0.0%	-25	1.59	24
100	2.10	\$ 108.08	-8.4%	-25	3.04	69
200	3.10	\$ 99.15	-15.9%	-25	4.49	114
300	4.10	\$ 91.05	-22.8%	-25	5.94	159

* Assumes a 31% tax rate

Tax-Free Bond Example: Considering Taxes

As we saw in the previous example, ignoring taxes when solving for scenario prices can lead to results that wouldn't make intuitive sense to some once taking taxes into account. In the table below, we have the same 10-year tax-free municipal bond with a coupon of 3.00% priced to yield 1.10% in the base case or a 1.59% tax-equivalent yield. This time we consider taxes and price the bond so that the tax-equivalent yield moves 1:1 against the benchmark yield and the tax-equivalent spread remains constant. Due to the effect of taxes, the projected price volatility is approximately 70% of a similar maturity taxable security.

10-Year Tax-Free Municipal (Considering Taxes)

Curve Shift	Yield	Price	% Px. Chg	Spread (bps)	TE Yield*	TE Spread
0	1.10	\$ 117.95	0.0%	-25	1.59	24
100	1.79	\$ 111.03	-5.9%	-56	2.59	24
200	2.48	\$ 104.58	-11.3%	-87	3.59	24
300	3.17	\$ 98.55	-16.4%	-118	4.59	24

* Assumes a 31% tax rate

What's an appropriate tax rate to use?

There is no single right tax-rate to use; however, the marginal buyers of municipal bonds tend to be individuals. We also know these individuals likely have a higher marginal tax-rate than a corporation. This is why we prefer to use a tax-rate higher than the current Corporate tax-rate of 21%. In this analysis, I assume a 31% tax-rate. It would be easy to justify a higher assumed tax-rate, which would cushion price adjustments even further. However, there are other considerations that warrant a more conservative tax-rate. Among these include uncertainty of future tax rates and any taxes that may occur due to a market discount.

Closing

It is much simpler to ignore taxes when projecting scenario prices on tax-free municipal bonds. However, does it make sense to ignore the biggest reason investors consider these bonds? Better said, have you ever invested in a tax-free municipal bond and *not* thought about your tax-equivalent yield? Probably not, so why ignore taxes if you don't have to?

As always, if you have any questions, comments, or would like to discuss further, please reach out to your account representative or directly to me.

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