

Tax Efficient Bond Management

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For many years portfolio managers asserted: “Focus on total return, let your accountant worry about taxes.” Much of this disregard for tax issues can be seen throughout the history of investment management. Institutional investment managers, for the most part, focused largely on tax-exempt clients, such as pension funds and foundations. Thus, most investment theory and the analysis of investment performance are based on models which totally disregard taxes.

Today, however, assets have shifted from institutional control to individual control. According to the 2001 AIMR annual report, 40% of its members are engaged in the investment counseling practice for individuals. The same report speculates that 10 years ago that number was more like 10% or 15%.

The basic difference between these individuals and tax-exempt institutions is that individuals pay taxes. Today our industry is working to develop new models in the taxable world to more effectively implement investment decisions, report to clients, and analyze their results. Given the intricacies of the tax code this will, by its nature, be a challenge.

Our focus in this paper is on one asset class; an asset class that, until the recent equity downturn, was one of the most overlooked. For many years individuals employed passive strategies to manage bond portfolios. In a passive environment, return is derived solely from coupon income; thus tax strategy efficiency is largely determined by whether one purchases a taxable or tax-exempt bond. Today many individuals have tax structures and investment needs as complex or more complex than any institution. Passive fixed income strategies are ineffective for dealing with both changing objectives and volatile markets.

The strategies for dealing with these needs in a fixed income portfolio are as complex and diverse as the individuals involved. While we may not cover all permutations, we hope to describe some of the basic techniques utilized to manage fixed income portfolios in a tax efficient manner. In addition, we will examine the challenges and opportunities these techniques present for evaluating after tax total return.

Portfolio Strategies

Bond Pricing Formula

To understand the challenge of tax efficient bond management one needs to understand the bond pricing formula. The formula simply stated is as follows:

$$\text{Price of bond today} = \text{PV (Coupon Payments)}_i + \text{PV(Maturity Payment)}_i$$

The price of the bond today is equal to the discounted present value of all coupon payments and the maturity payment. The term (i) represents the market interest rate, or discount rate, for the bond. As interest rates change the bond price rises and falls according to a defined mathematical formula. This mathematical formula is true provided realized capital gains and losses associated with the price fluctuation are untaxed or taxed at the same rate as the coupon payments.

Municipal Bond Strategies

From the perspective of a municipal bond portfolio, the very words “tax efficient bond management” appears redundant. Yet there are several ways taxes apply to municipal bonds including: Alternative Minimum Tax for private activity bonds, income tax on discount bonds, and state and local taxes. For our purposes we are focusing on the inter-relationship between income or, more precisely, book yield and capital gains and losses.

When a municipal bond is sold at a gain the net proceeds or price is reduced by the tax on that gain. Thus, when municipal bonds are sold the bond pricing formula does not hold.

For a municipal bond sold at a gain: ⁽¹⁾

$$\text{Price of bond today} - \text{Tax on the gain} < \text{PV}(\text{Book Yield}) + \text{PV}(\text{Maturity Payment})$$

The challenges imposed on a portfolio manager are self evident from this. Capital gains taxes are transaction costs. The higher the tax, the greater the cost. Unless a portfolio manager can make decisions which compensate for this transaction cost, realized gains should be avoided or minimized. Even when gains can be offset with losses it is normally not advantageous to realize gains on municipal bonds. The coupon is always tax free, but the outstanding losses may be better utilized to reduce taxes on taxable assets. A loss write-off is an asset and, as such, it should not be wasted indiscriminately. Municipal gains should be realized only when the benefits of the replacement bond are so significant as to cover the tax cost. The following are some examples of transactions which do and do not meet these criteria:

Examples of Gain Strategies:

A portfolio holds a Chicago bond that was acquired several years ago when interest rates were higher. Does it make sense to sell it, capture the gain, and reinvest in another bond? The answer depends on the acquisition yield of the Chicago bond, the yield of the replacement bond, and whether the yield on the replacement is sufficiently high to compensate for the gains tax. Example 1 illustrates such a transaction.

On the surface this is the type of transaction that portfolio managers consider a lay up. Sell one bond at a yield of 4% buy a similar replacement, and pick up 20 basis points in yield. Market inefficiencies frequently present opportunities like this, and exploiting such inefficiencies is one way portfolio managers can add value through active management or trading. Many times these opportunities can be captured without increasing duration or credit risk. In a world without taxes the benefit is an additional \$200 a year in income over the life of the holding. Each transaction may add only .10 of a basis point to a portfolio’s return, but turnover of 60% or higher may add 10 to 20 basis points in the course of a year. In the bond market, where a few basis points can mean the difference between the third and first quartile, this is a low risk strategy to enhance performance. In the tax free world of foundations and ERISA it is a viable strategy.

(1.) Since bonds may be purchased at a premium or a discount, book or yield at time of acquisition is more representative of the income component than coupon.

Example 1
Municipal Bond Sold at a Gain with Negative Tax Implications

Sale - Bond A	Chicago	Buy - Bond B	Texas
Coupon - 6.00%	Maturity 1/1/07	Coupon - 6.00%	Maturity 1/1/07
Par	\$ 100,000.00	Par	\$ 100,000.00
Cost Basis	\$ 100.00	Cost Basis	\$ 108.04
Acquisition Yield:	6.00%	Acquisition Yield:	4.20%
Sale Price:	\$ 108.98		
Sale Yield:	4.00%		
Realized Gain:	\$ 8,982.00		
Annual Income	\$ 6,000.00	Annual Income	\$ 4,200.00
5yrs income	\$ 30,000.00	5yrs income	\$ 21,000.00
Present Value	\$ 27,677.00	Present Value	\$ 19,373.00
discount rate 4.20%**		discount rate 4.20%**	
Pre tax benefit	Income earned on Texas Bond + Realized Gain	19,373 + 8,982	\$ 28,355.00
Less Taxes @20% capital gains rate			\$ 1,796.00
After Tax Proceeds			\$ 26,559.00
Net Transaction Cost*			\$ (1,118.00)

*Compares benefit of holding Bond A versus Selling Bond A and replacing it with Bond B
Transaction date assumption 1/1/02. Bond qualifies as long term holding

** Used higher security yield for discount rate to reflect market yields and produce more conservative net present value
Identical discount rate used for consistency. Changes in discount rate results in conclusions consistent with premise.

In the taxable world, taxes add a transaction cost, which in this example exceeds the benefit. Subtracting the gains tax liability, the transaction illustrated in Example 1 costs the portfolio \$1,118. If the yield on the replacement bond was higher, the tax liability might be offset. If the gain was smaller the tax liability could be covered. In either circumstance, gains limit a tax sensitive portfolio manager's ability to profit from small market inefficiencies. Turnover on a portfolio that is predominantly at a gain should be minimized.

For performance analysis the implications are material. A tax efficient manager may lag the benchmark yet have more favorable after tax performance than a manager who beats the benchmark. The dollars in the client's pocket at the end of the day will be greater when tax efficient strategies are employed.

Such strategies may be employed in a mutual fund, but a mutual fund's emphasis on performance makes it unlikely that a fund employing such tactics would be successful at attracting assets. Strategies of this type are better suited to separate accounts, where they can be further customized to the specific investor need.

This does not mean that gains should never be realized. Gains taxes are transaction costs, which need to be overcome. When the gains tax is relatively small, the market opportunities to offset the transaction cost are likely to be greater, since the costs can be covered with a relatively small amount of additional yield. If yield spreads due to credit, sector, or curve shape are very wide, there is more opportunity to compensate for the gains tax. The second example is just such a situation. In Example 2 the market yield advantage is much greater and the gain tax is lower than in our first example. As a result the present value benefit is \$1,491.

When realizing gains it is important to cover the tax cost within a reasonable time frame, or the potential transaction is best rejected.

Example 2

Municipal Bond Sold at a Gain - Tax Cost Offset by Replacement

Sale - Bond A	Maui Cnty Hawaii	Buy - Bond B	Texas State GO
Coupon - 6.25%	Maturity 3/1/08	Coupon - 5.25%	Maturity 10/1/11
Par	100,000	Par	100,000
Cost Basis	\$ 106.07	Cost Basis	\$ 106.93
Acquisition Yield:	5.08%	Acquisition Yield:	4.36%
Sale Price:	\$ 112.80		
Sale Yield:	3.87%		
Realized Gain:	\$ 6,730.00		
Annual income	\$ 5,080.00	Annual income	\$ 4,360.00
Total Income	\$ 30,480.00	Total Income	\$ 26,160.00
Present Value	\$ 27,468.00	Present Value	\$ 23,575.00
6yrs 4.36% **		6yrs 4.36% **	
Pretax benefit Gain of \$6730 + \$23,575			\$ 30,305.00
Tax on Gain @20% Capital Gains Rate			\$ 1,346.00
After Tax Benefit			\$ 28,959.00
Net Transaction Benefit*			\$ 1,491.00

*Compares benefit of holding Bond A versus Selling Bond A and replacing it with Bond B
Transaction date assumption 3/1/02. Bond qualifies as long term holding.

** Used higher security yield for discount rate to reflect market yields and produce more conservative net present value
Identical discount rate used for consistency. Changes in discount rate produces results consistent with premise.

Municipal Bond Sold at a Loss:

$$\text{Price of bond today} + \text{Tax Credit} > \text{PV (Book Yield)} + \text{PV (Maturity Payment)}$$

Losses provide an opportunity, since the loss can be used as a credit to offset capital gains realized in other segments of the client's portfolio. When the municipal bond is sold at a loss, and another bond is purchased, the higher yield on the replacement bond will usually compensate the investor for the loss

over a reasonably short pay back period. Moreover since this incremental income flows through to the investor tax free, the market and the tax code have provided an opportunity for “tax arbitrage” through aggressive loss harvesting. The manager’s goal is to realize losses and generate higher future tax free income flows.

Over the life of a bond portfolio the tax efficient municipal bond manager should strive not to “capture” gains, but to offset gains on taxable assets with losses, thus converting gains taxable today into future tax free income flows.

Tax swaps have been a staple of municipal management for decades, but active, ongoing loss harvesting is a relatively recent practice. The benefit of tax swaps is that taxable gains get converted into future tax free income. In a rising rate environment “harvesting” losses may enhance after tax portfolio return more significantly than pretax strategies. **Unfortunately the present performance analysis techniques do not capture the tax.**

**Example 3
Municipal Bond Sold at a Loss**

Sale - Bond A	New Mexico	Buy - Bond B	Atlanta
Coupon - 4.50%	Maturity 6/15/03	Coupon - 6.00%	Maturity 1/1/04
Par	\$100,000	Par	\$100,000
Cost Basis	102.761	Cost Basis	105.731
Acquisition Yield:	3.75%	Acquisition Yield:	4.53%
Sale Price:	100.304		
Sale Yield:	4.40%		
Realized Loss:	\$ (2,457.00)		
Annual income	\$ 3,750.00	Annual Income	\$ 4,530.00
4 years income	\$ 15,000.00	4 years income	\$ 18,120.00
Present Value	\$ 14,052.00	Present Value	\$ 16,975.00
Discount Rate 4.53%**		Discount Rate 4.53%**	
Realized Loss			\$ 2,457.00
Loss Adjusted Income			\$ 14,518.00
Tax Loss Deduction @ Short Term Rate 39.6%			\$ 917.00
Tax Benefit plus Income Benefit			\$ 15,435.00
Net Transaction Benefit*			\$ 1,383.00

*Compares benefit of holding Bond A versus Selling Bond A and replacing it with Bond B
Transaction date assumption 6/15/99. Bond held 10 months and thus qualifies as short term holding

** Used higher security yield for discount rate to reflect market yields and produce more conservative net present value
Identical discount rate used for consistency. Changes in discount rate results in conclusions consistent with premise.

Our third example is a tax loss swap that was typical a few years ago when interest rates were higher. Even if the tax loss is not taken into account, the transaction is beneficial because the higher income offsets the loss in a relatively short time period. Regarding the loss, it is important to note that the holding period of the New Mexico bond was less than one year. Careful monitoring of holding period is important, because short term losses have a more favorable tax impact than long term losses. The losses can be applied at the higher tax rate applicable to short term gains.

Up to this time we have focused on static analysis. We feel that is appropriate, because it eliminates dependence on favorable spread movements, or interest rate changes. The speculative element is removed from the transaction decision. Potential interest rate scenarios can be evaluated and may result in total return benefits in addition to the tax benefits. In the above tax loss swap, coupon and maturity decisions combine to favor the Atlanta bond over the New Mexico bond if interest rates change. We also might consider the probability of narrowing sector or credit spreads, yield curve shifts, and security selection. In our opinion, however, transactions should cover their tax cost in a static environment, thus stand on their own merit and not be subject to probabilistic assumptions.

Swap Scenario Analysis

Interest Rate Change	Atlanta Gain/(loss)	New Mexico Gain/(loss)
+1.00%	(\$3,960)	(\$4,850)
+.50%	(\$2,020)	(\$2,400)
-.50%	\$1,990	\$1,740
-1.00%	\$4,103	\$3,517

Assumes parallel shift in market interest rates.
Impact on bond value is immediate

Taxable Bond Strategies

The reasons for using taxable bonds in a taxable client's portfolio are numerous. Individuals, for example, in the AMT bracket may benefit because higher taxable income after being reduced for the AMT rate may exceed income on available municipal bonds. Other individuals may have ordinary income deductions, which can offset taxable income. Even for individuals in the top tax brackets, yield relationships between taxable and tax exempt bonds may be so narrow that the benefit of municipal bonds is marginal.

When taxable bonds are used in a client portfolio, three factors must be considered in addition to capital gains. The first is the yield of the bond relative to the after tax yield of comparable municipal bonds after adjusting for the client's tax rate. Second is how those yields compare to historical relative value comparisons. Third, prospects for spread widening and narrowing should be evaluated, given the market environment and economic conditions.

At higher tax rates use of taxable bonds normally imposes a transaction or opportunity cost. If taxable yields are compared to municipal yields on a tax adjusted basis (taxable yield – taxes), the taxable bond may yield less. At high tax rates most taxable sectors normally yield less. Historical comparisons performed by our firm using index yield data provided by Lehman Brothers and Bloomberg indicate that the average clearing rate or implied tax rate factored into the market is approximately 25% to 30%.

Somewhere in this range investors are indifferent between taxable bonds and municipal bonds. At any one point in time market conditions may cause the breakeven tax rate to be higher or lower.

Beyond current market yield comparisons, municipal and taxable yields should be assessed in a historical context. To determine appropriate sector allocation, relative taxable yields from a number of sectors, including Treasuries, corporate, and asset-backed bonds, should be compared to municipal bonds over extended and varied time periods. Present yield spreads and historical relative value can be a guide as to when taxable bonds are over or under valued, but can not provide definitive data as to the prospects for potential excess return or “capital appreciation” alone. Fundamental and intuitive assessment of market conditions is essential in determining potential return prospects. **As accurate as we may attempt to be in our forecasts, they are forecasts nonetheless. Implementation of tax efficient strategies, including the taxable/tax free allocation decision should limit dependence on market or spread forecasting in favor of what is known and quantifiable given the present market conditions.**

Taxable bonds, therefore, are most effectively utilized in taxable client portfolios when there is no tax cost, or the tax cost is minimal. If a client has ordinary income write-offs from a business, the taxable income may be earned essentially tax free. When the total return prospects for mortgage backed or corporate bonds are favorable because of abnormally high yield spreads, and consequently outperform, that is a bonus.

Taxable Bonds and Realized Capital Gains

The strategy for managing realized gains is different for taxable bonds than for municipal bonds. The yield or income component of taxable bonds can be taxed at a federal tax rate of up to 38.6%. If the bond has appreciated, the excess yield above the market will continue to be taxed at 38.6% (assuming the highest marginal federal income tax rate) as long as the bond is held. But if the bond is sold for a long term gain, the is taxed at 20%. Returning to our formula:

$$\text{Price of the bond today} - \text{Capital gain tax} > \text{PV (Book Yield-Income Taxes)}_i + \text{PV (Maturity)}_i$$

Assuming book yield is taxed at the ordinary income rate, it is beneficial to realize gains on taxable bonds when the gain is taxed at the long term rate. Taxable bond strategies tend to be virtually the opposite of municipal strategies. Long term gains are taxed at a lower rate than ordinary income. Since short term gains are taxed at the same level as ordinary income, there is no disincentive from a tax standpoint. Transactions which are taxed at the short term gain’s rate can stand on their own merit.

Example 4

Taxable Bond Sold at a Long Term Gain - Replaced by Taxable Bond

Sale - Bond A	U.S.Treasury	Buy - Bond B	Fannie Mae
Coupon - 6.25%	Maturity 2/15/07	Coupon - 7.125%	Maturity 3/1/07
Par	\$100,000	Par	\$100,000
Cost Basis	101.066	Cost Basis	109.008
Acquisition Yield:	6.00%	Acquisition Yield:	5.09%
Sale Price:	106.606		
Sale Yield:	4.75%		
Realized Gain:	\$ 5,540.00		
Annual income	\$ 6,000.00	Annual income	\$ 5,090.00
Net of Taxes 38.6 rate	\$ 3,684.00	Net of Taxes 38.6 rate	\$ 3,125.00
Total Income - 38.6 tax rate	\$ 18,420.00	Total Income - 38.6 tax rate	\$ 15,625.00
Present Value discount rate 5.09%**	\$ 16,720.00	Present Value discount rate 5.09%**	\$ 14,182.00
Gain			\$ 5,540.00
Tax on Gain @20%			\$ 1,108.00
After Tax Benefit			\$ 4,432.00
Income and gain benefit			\$ 18,614.00
Net transaction benefit*			\$ 1,894.00

*Compares benefit of holding Bond A versus Selling Bond A and replacing it with Bond B
Transaction date assumption 2/15/02. Bond held over 12 months and thus qualifies as long term holding

** Used higher security yield for discount rate to reflect market yields and produce more conservative net present value
Identical discount rate used for consistency. Changes in discount rate results in conclusions consistent with premise.

Our fourth and final example clearly shows there is a benefit to realizing long term gains. In this example we assume that the income or yield is fully taxed. If the ordinary income tax rate is 0, or lower than the gains rate, this strategy would not be appropriate. The benefits in Example 4 accrue because of the disparity between the tax treatment of the gain compared to the tax treatment of ordinary income, and the market yield advantage to the Fannie Mae over the Treasury. **In a bull bond market, with declining rates, higher turnover is more tax efficient than low turnover for taxable bonds.**

Taxable Bonds and Realized Losses

Losses are even more complex with taxable bonds and here there is not a clear conclusion. The correct strategy depends on the type of transaction, and the client's tax circumstances. If the loss occurs because interest rates have moved higher, selling the bond and replacing it with another taxable bond will result in higher taxable income which may be taxed at a federal tax rate of up to 38.6%. If the loss is used to offset ordinary income or gains taxed at 38.6% the effect is neutral. However, if the loss is used to offset

capital gains taxed at 20%, the long term gain is converted into higher ordinary income in the future. In this situation the formula would be:

$$\text{Price of bond today} + 20\% \text{ capital gain write-off} > \text{PV (Book Yield} - \text{ordinary tax)} i + \text{PV (maturity)} i$$

The formula above does not reflect the taxes associated with income on the replacement bond. If the replacement produces higher income and if it is taxed at a rate above the gains tax rate, a higher tax burden may result. The formula below would apply:

$$(\text{Price of the bond today} + 20\% \text{ capital gain write-off}) + (\text{PV (Book Yield Replacement} - \text{Ordinary Tax)} i + \text{PV (Maturity Replacement)} i) < \text{Holding the existing bond}$$

This formula suggests that it is more appropriate to hold the existing security than sell it. In practice, it is less than clear which is more beneficial, and the benefit will depend on a thorough analysis of each individual transaction. A taxable bond sold at a loss represents a dilemma. The loss will reduce current period capital gains. If another taxable bond is purchased as a replacement, however, a higher future stream of taxable income will produce a higher ordinary income tax liability. If we follow our prior analysis model, the substitution of a gain liability taxed at 20% for an income stream taxed at 38.6% is not economically viable. However, there is an intangible benefit of deferring taxes into the future, and this may outweigh the short run economics. Deferring taxes indefinitely has the same impact as paying no taxes. If a transaction involves a trade from a taxable to a municipal bond, the same rule that applies to municipal swaps is relevant, and the loss should be realized.

Challenges for Performance Evaluation

A primary difficulty with assessing the effectiveness of tax efficient strategies is that present performance evaluation methods do not capture tax benefits. Moreover, strategies which produce pre-tax alpha may result in negative after tax alpha. Reporting of after tax returns, rather than alleviating the problem, may add to the confusion.

At present, few managers are able to report after tax returns. The new AIMR standards for separate accounts do not take effect until 2004. Even then it will be some time until longer run historical data is available. The standards themselves are fairly straightforward. Income is reduced by the appropriate tax rate, gains taxes and loss credits are recorded in the period the gains and losses are realized. Tracking such accounting issues is complex. While software vendors will eventually meet the challenge, implementation of the standards will be costly and time consuming. Larger firms, with inflexible infrastructures, will probably have greater difficulty revamping reporting systems.

Compositing issues are even more complex. Currently most firms assign accounts to composites based on similar objectives, strategies, and benchmarks. Despite commonalities, many firms have a multitude of composites. The days are long past where a consultant can ask for a firm's "core" taxable or core "municipal" strategy and expect any one composite to be truly representative of a firm's performance. Given the broad range of tax circumstances, composites are likely to expand exponentially. One has to wonder if any one composite or composite data itself will be meaningful.

After tax benchmarks pose another dilemma. Ideally after tax returns should be calculated for benchmarks following the same standards applied to the portfolio. Currently there is no incentive for benchmark sponsors to track turnover, let alone gains and losses. The volume of securities is inundating. As of March 2002 the Lehman Municipal Index contained over 42,953 individual bonds.

Despite the challenges consultants will have some tools at their disposal to assess after tax effectiveness:

1. Turnover - Until the recent bear equity market, low turnover has been assumed to be tax efficient. Portfolio turnover needs to be assessed in light of the market. For municipals, high turnover in a bull market should be a warning. Likewise low turnover in a bear market is a concern. High or low turnover in and of itself is not indicative of tax inefficiency, but further questioning and investigation of the manager should reveal the underlying strategy.
2. Qualitative Analysis - Our industry has fallen into the trap of believing that we can objectively quantify all value. Yet the more we quantify, the greater the need for accurate qualitative interpretation of the data. Questionnaires and conferences with the portfolio team will lead insight into portfolio strategies employed.
3. A representative portfolio, including gain and loss recap for specific years – Ask to see a representative portfolio of the same or similar style mandate you are considering. Is the manager realizing losses in down years? Worse yet, does the manager realize gains in down years without any significant attempt to offset the gains? Are unrealized losses left? Why? Do realized gains appear extraordinarily high in bull markets?
4. After tax returns – When available, ask to see after tax returns on a composite or representative portfolio. In bull markets after tax returns should be very close to pretax returns. For example if 40% of the market return is due to gains, and a manager's after tax return is 97% of his pretax return in a bull market, then the manager is likely to be fairly tax efficient. In bear markets after tax return can and should exceed pretax return. Much will depend, however, on the embedded gain structure of the portfolio, the time of portfolio inception, and lastly, the tax objectives of the client.

It is evident that two dimensional risk reward analysis of performance data is only a starting point. Taxes bring a third dimension into the equation. Tax situations for individuals are so unique that any analysis must be multi dimensional and involve qualitative assessment of the managers by informed consultants.

Conclusion

The beauty of tax efficient strategies are demonstrated in the immediate measurable benefit. With other strategies to enhance return such as duration management, sector rotation, or security selection the benefits are realized only if the decision turns out to be correct. No matter how skilled we portfolio managers are at any of these strategies, there is always the possibility that we are wrong. **The effectiveness of tax efficient decisions does not depend on probability.**

Tax benefits are assessable at the time of the transaction. If no benefit exists, there is no transaction. Tax efficient strategies can be incorporated with all the above strategies. **Portfolio managers who pay attention to the details of tax efficiency, such as gains, losses, book yield and replacement yield, apply a discipline to their decision process that is likely to produce better decisions and significant tangible results for the client.**

Performance evaluation however is a greater challenge. **The numbers may not reveal a manager's "tax alpha" and "pretax alpha" may be misleading.** It is ironic that tax strategies, whose benefits are so quantifiable at the portfolio management level, are so difficult to assess after the fact.

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