
Tax-Efficient Investing for Tax-Deferred and Taxable Accounts

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Both the popular financial press and the academic literature have discussed the optimal way to hold different classes of investment assets, whether in tax-deferred (e.g., pensions, IRAs, annuities) or fully taxable accounts.*

Our study analyzes a simple asset allocation strategy using stocks and bonds, accounts of equal size, and a long time horizon (over twenty years).

Investors cannot always put all their stocks in one account and all their bonds in another, but the results of this study support previous studies that claim that stocks, not bonds, should be held in tax-deferred accounts. We focus our attention on the analysis of shorter investment horizons, varying tax brackets, complex asset allocation strategies using five different asset classes, accounts of differing size, investors who can hold assets until death (getting the benefit of the step-up in cost basis in taxable portfolio), and reduced income tax brackets at retirement.

PRIMARY ANALYSIS

We begin with a basic asset allocation strategy of 100% stocks and assume an 11% pre-tax return over a twenty-year time horizon and liquidation at end of the investment period with all taxes due paid. (We assume that the portfolio is not subject to future contributions or distributions, except upon liquidation at the end of the holding period.)

Assuming annual turnover of 60%, a 39.6% income tax rate (dividends and short-term gains); and a 20% capital gains tax rate (on 70% of all gains), a \$1 million stock portfolio will be worth \$4,579,196 in a taxable account. That same \$1 million will be worth \$4,869,636 in a tax-deferred account, a difference of more than 6%.

Although taxes on the entire tax-deferred account are paid at the higher income tax rate at the end of the period, compared to the lower capital gains rate paid on the taxable account, the benefit of compounded returns in the tax-deferred account outweighs the ultimate tax liability. Investors are paying a higher tax rate, but on a *significantly* larger portfolio.

We then perform this same analysis using a 100% bond strategy. Assuming a return of 5.8% in the tax-deferred account (taxable bonds) and a return of 4.2% in the taxable account (tax-exempt bonds), \$1 million grows to \$2,276,955 in the taxable account, but to only \$1,865,307 in the tax-deferred account, 18% less than the taxable account. The spread between taxable and tax-exempt yields isn't significant enough at the 39.6% income tax level to put taxable bonds in a taxable account. Therefore, holding tax-exempts in a tax-deferred account makes no sense since return is lower, and all income will be taxed upon liquidation.

We can conclude that over a long investment horizon, after-tax returns are maximized by investing stocks in tax-deferred accounts, and bonds (tax-exempt) in taxable accounts.

SECONDARY ANALYSIS

Assumptions

To help with the analysis of maximizing after-tax returns, we build a computer model as outlined by Garland (1997), but exclusive of management fees. We model two separate portfolios: 1) one that pays taxes annually, i.e., the taxable account; and 2) one that doesn't, i.e., the tax-deferred account. Each portfolio can hold up to seven types of assets spanning five asset classes, as indicated in Exhibit 1.

Using the assumptions outlined in Exhibit 1, we grow the two portfolios, paying annual taxes on income and realized gains and upon liquidation in the taxable account, and upon liquidations only in the tax-deferred account.

EXHIBIT 1 – Assumptions By Asset Class (%)

Product	Large-Cap		Small-Cap	International	Emerging Markets	Bonds	
	TE	A				T	TE
Total Return	10.5	11.0	12.6	10.0	15.0	5.8	4.2
Yield	2.5	2.5	1.0	0.75	0.0	5.8	4.2
Turnover	30.0	60.0	40.0	40.0	40.0	0.0	0.0
Capital Gains Tax Rate % of Capital Gains	20.0	20.0	20.0	20.0	20.0	N/A	N/A
Short-Term	0.0	30.0	20.0	20.0	20.0	N/A	N/A

Product: TE = tax-efficient strategy or tax-exempt, A = actively managed, T = taxable

Model

Using basic spreadsheet software, we are able to determine the distribution of assets to each portfolio that would maximize the total after-tax return of the combined portfolios while generating our predetermined asset allocation strategy.

For example, an investor's \$1 million portfolio is invested \$250,000 in a tax-deferred account and \$750,000 in a taxable account. Assume that the appropriate asset allocation strategy for this client is 50% large-cap stocks, 15% small-cap stocks, 20% bonds, 10% international stocks, and 5% emerging market stocks. The investor is in the 39.6% tax bracket and has a twenty-year investment horizon. Our goal is to invest each account in a way that will maximize after-tax return over the investment horizon and generate the appropriate asset allocation strategy across the two accounts without rebalancing. Exhibit 2 shows the distribution of the two portfolios.

EXHIBIT 2 – Distribution of Asset Allocation Strategy between Tax-Deferred and Taxable Accounts

Tax-Deferred Account	Asset Allocation		Taxable Account	Total
\$250,000	Beginning Value		\$750,000	\$1,000,000
-50,000	Emerging Markets	5%		-50,000
-200,000	Large-Cap Stocks	50%	-300,000	-500,000
	Small-Cap Stocks	15%	-150,000	-150,000
	International Stocks	10%	-100,000	-100,000
	Bonds	20%	-200,000	-200,000
\$0		100%	\$0	\$0

We define the allocation strategy and account values as constraints. Both portfolios must be 100% invested, so we establish this as a constraint as well. The software allows users to calculate the maximum, minimum, or exact value for a specific equation. In this case, we are looking for the percentage of each portfolio (dollars) that should be invested in each asset class in order to maximize the after-tax return of the combined portfolios.

Maximizing After-Tax Return

After running hundreds of scenarios using different account values, asset allocation strategies, time horizons, and income tax rates, we conclude that over long investment periods, asset classes that generate the greatest tax liability should first be placed in tax-deferred accounts, followed by the asset class with the next-greatest tax liability until all assets in the tax-deferred account have been invested. The remaining asset classes are placed in taxable accounts.

There are essentially three factors that determine the tax liability of an asset class: total return, yield, and turnover. Asset classes with the highest return and turnover will generate the highest tax liability. Emerging markets — with an assumed total return of 15% and turnover of 40%, have the highest tax liability of any asset class, followed by large-cap stocks, with a lower return of 11% but significantly higher turnover at 60%; small-cap stocks, which have a higher return than large-cap stocks at 12.6% but less turnover of 40%; international stocks, with lower return than any other equity and turnover equal to emerging and small-cap stocks; and bonds, with both less return and no turnover (capital gains are not a factor in our bond assumptions).

Choosing the asset class with the highest tax liability is not intuitive; we use the computer model to help run the calculations. Had we used different assumptions for return, turnover, or yield, we would likely have experienced different results. (*See the appendix for illustration of tax liability calculations.*)

Over a twenty-year investment horizon, after-tax returns are maximized by holding emerging market stocks and a portion of the large-cap stocks in the tax-deferred account and the remaining assets in the taxable account. The emerging market class is held in the tax-deferred account because its inherent tax liability is based on the assumed return of 15% — the highest of any asset class. Large-cap stocks are also held in the tax-deferred account because of the projected tax liability associated with the assumed 11% return and the 60% turnover rate — again, the highest of any asset class. Because the tax-deferred account is the smaller of the two accounts, not all large-cap stocks can be held in this account. The remaining portion of large-cap stocks and all other asset classes must be held in the taxable account (even though the after-tax return might be higher if the assets were held in the tax-deferred account).

Different Account Size

If the investor has a large portion of assets in the tax-deferred versus the taxable account, the distribution across asset classes is exactly the same, with slightly different amounts in the tax-deferred versus taxable accounts. Beginning with the tax-deferred account, Exhibit 3 (*see following page*), reflects the appropriate distribution between taxable and tax-deferred accounts when the tax-deferred is the larger of the two accounts.

Even if the allocation strategy were less aggressive, with an allocation of 30% large-cap stocks, 10% small-cap stocks, 5% international stocks, 5% emerging market stocks, and 50% bonds, the distribution pattern to tax-deferred and taxable is exactly the same. Beginning with the tax-deferred account, emerging market assets are placed first, followed in order by large-cap stocks, small-cap stocks, international stocks, and bonds. The size of each account will dictate how many asset classes are held in each account, as illustrated in Exhibits 2 and 3.

EXHIBIT 3 – Distribution of Asset Allocation Strategy when Tax-Deferred is Larger than Taxable Account

Tax-Deferred Account (IRA)	Asset Allocation		Taxable Account (IMA)	Total
\$750,000	Beginning Value		\$250,000	\$1,000,000
-50,000	Emerging Markets	5%		-50,000
-500,000	Large-Cap Stocks	50%		-500,000
-150,000	Small-Cap Stocks	15%		-150,000
-50,000	International Stocks	10%	-50,000	-100,000
	Bonds	20%	-200,000	-200,000
\$0		100%	\$0	\$0

Active versus Tax-Efficient Investing

A point of clarification before we move on. Within large-cap stocks there are essentially two separate products: 1) a normal actively managed large-cap stock product, and 2) a more tax-efficient large-cap stock product. We assume a lower pretax return of 50 basis points on the tax-efficient product because of the lower turnover level of 30% versus 60%. (An active manager who typically generates 60% turnover will experience some negative impact to pretax returns when reducing turnover to 30%.) While our model treats the two products as two separate asset classes, the combined distribution could not exceed our overall allocation to the class (50% in this case).

In almost all cases, when large-cap stocks are held in a tax-deferred account, our model selects the actively managed product because of the higher projected return and no tax impact on turnover. And, when the large-cap stocks are held in the taxable account, our model selects the tax-efficient product because of the assumed lower turnover and no short-term gains, with all gains qualifying for the lowest 20% capital gains tax rate.

In our primary analysis, we note that a basic 100% stock allocation would grow to \$4,579,196 in a taxable account. Had the taxable account held the tax-efficient strategy instead of the actively managed large-cap strategy, the account would have grown to \$4,760,732 after twenty years, based on a tax rate of 39.6%. According to our analysis, investors in a higher tax bracket should invest the large-cap stocks held in a taxable account in a tax-efficient product and the large-cap stocks held in a tax-deferred account in an actively managed product to maximize after-tax returns.

Bonds also have two separate products: tax-exempt and taxable. Again, although the model treats these as separate asset classes, the total allocation to bonds could not exceed the recommended strategy. In general, taxable bonds should be held in a tax-deferred account to obtain the higher return and the benefit of compounding, and taxable accounts should hold tax-exempt bonds that generate a higher after-tax return than taxable bonds, assuming the highest income tax rates.

Investors in Lower Tax Brackets

So far, we've focused on investors in the 39.6% income tax bracket. For investors in a lower tax bracket, the results are exactly the same; only the magnitude of the results is different. In other words, beginning with a tax-deferred account, distribution of asset classes starts with the class subject to the highest tax liability, emerging markets, followed by large-cap stocks, small-cap stocks, international stocks, and bonds, just as in Exhibits 2 and 3.

There are a few qualifications under the lower tax bracket scenario. First, if we assume a tax rate of 28%, the model shows that investors maximize after-tax returns by holding the actively managed large-cap stock product in the taxable *and* tax-deferred accounts. At the lower income tax rates, it is not beneficial to give up 50 basis points of pretax return for less turnover, as we've assumed. If an investor in a lower income tax bracket already holds a portfolio of low-cost basis stock in a taxable account, however, after-tax returns will not be improved by switching to an actively managed product due to the tax costs associated with liquidating and paying taxes on the embedded gains.

Holding Portfolios for a Lifetime

In all the analysis we have assumed that both portfolios are liquidated at the end of the investment horizon and taxes due are paid. If an investor dies holding both portfolios and is able to get a step-up in the cost basis in the taxable account, our allocation distribution would be no different. We would still distribute asset classes that generate the highest tax liabilities to the tax-deferred account, such as emerging markets, followed in order by large-cap stocks, small-cap stocks, and so on.

The embedded gains in the taxable account for which the step-up rule would apply may be relatively small for a number of reasons. First, there will have been some turnover in the portfolio over the twenty-year period. Gains will have been taken, and taxes paid annually. This reduces the value of the step-up rule.

Second, the highest-returning assets are held in the tax-deferred account versus the taxable account. Therefore, the embedded gain should be lower than it otherwise would have been, reducing the value of the step-up rule, as well.

Finally, bonds may be a large portion of a taxable account. Since bonds are held to diversify risk and generate income over capital gains, there will be very little value to the step-up rule upon death.

The step-up rule does not apply to tax-deferred accounts. Ignoring other estate planning strategies available, in general, future distributions from these accounts to beneficiaries will be taxed as ordinary income. Therefore, the value of the taxable account will be greater, but no change in distribution should occur.

Lower Tax Bracket at Retirement

If an investor's tax bracket actually declines from 39.6% to 28% at retirement, our study finds there should be no change in the asset class distribution methodology. Emerging markets would be held in tax-deferred accounts, followed by large-cap stocks, small-cap stocks, and so on. The biggest difference would be in the size of the tax bill on the tax-deferred account. Instead of paying 39.6% upon liquidation, the investor would pay only 28% of the total value of the tax-deferred account, again assuming the entire portfolio is liquidated at the end of the period.

If investors can withdraw from a tax-deferred account in a lower tax bracket, their focus should be on building up the value of that portfolio. In this case, asset classes with the highest tax liability should be held in a tax-deferred account.

Time Horizon

As illustrated in Exhibit 4 (*see following page*), the distribution of asset classes to tax-deferred and taxable accounts will change if the investor has a time horizon of less than twenty years. From this illustration, you can see that for shorter investment horizons (less than ten years), the greatest difference in allocation priority is for the fixed income portion of the portfolio.

EXHIBIT 4 – Distribution of Asset Allocation Strategy when Time Horizon is Less than 20 Years

Priority of Allocation Beginning with Tax-Deferred Account	10 Years	15 Years	20 Years
1.	International	Large-Cap	Emerging Markets
2.	Bonds	International	Large-Cap
3.	Large-Cap	Small-Cap	Small-Cap
4.	Small-Cap	Emerging Markets	International
5.	Emerging Markets	Bonds	Bonds

Assumes 39.6% income tax rate

With an investment horizon of twenty years or more, bonds are distributed to a tax-deferred account last, meaning that in a majority of circumstances bonds will be held in a taxable account. Over shorter investment horizons, however, without the benefit of long-term compounding, it is generally more tax-efficient to take the gains on equities in a taxable account paying the lower 20% capital gains tax rate than it is to hold the equities in a tax-deferred account and pay taxes at the higher 39.6% income tax rate at the end of the shorter investment horizon.

The effects of compounding means that, for an investment period shorter than ten years, the after-tax return (or yield) on taxable bonds held in a tax-deferred account is generally higher than the after-tax return on tax-exempt bonds held in a taxable account. And, the after-tax returns on equities held in a taxable account are generally higher than the after-tax returns of equities held in a tax-deferred account and taxed at the higher 39.6% income tax rate. We say “generally higher” because the results may be different depending on client-specific assumptions (e.g., tax rate, turnover). It is only with the benefit of a computer model that we are able to calculate the appropriate distribution for investment periods of shorter than twenty years, based on our assumptions.

For investment horizons of ten years or more but shorter than twenty years, Exhibit 4 can serve as a guide. At ten years, the after-tax return on emerging markets, the asset class generating the highest tax liability, is higher in a taxable account, paying taxes at the 20% capital gains rate, than in a tax-deferred account paying taxes at the higher 39.6% income tax rate. The same can be said for large-cap and small-cap stocks, as well.

At fifteen years, the after-tax returns on stocks are higher in a tax-deferred account than the taxable account; the lowest-returning stock, however, is generally first placed in the tax-deferred account than the taxable account; the lowest-returning stock, however, is generally first placed in the tax-deferred account, e.g., international stocks (10% return), small-cap stocks (12.6% return), and emerging market stocks (15% return). The large-cap stocks, with a return of 11%, are the exception, given their higher turnover rate of 60%. For large-cap stocks, even after paying the higher income tax rate on the tax-deferred account, the benefits of compounding outweigh the benefit of the lower 20% capital gains tax rate in the taxable account over a fifteen-year investment horizon.

We look at a stock and bond portfolio of equal value, \$1 million, over different investment horizons and different income tax rates to determine what year the model switches from holding equities in a taxable account (shorter-term) to holding them in a tax-deferred account (longer-term). In other words, at what point does the benefit of tax deferral overcome the disadvantage of a higher income tax rate?

We find that the benefits of compounding outweigh the higher tax rate after eight years for investors in the 28% and 31% income tax bracket, ten years for the 36% bracket, and eleven years for the 39.6% bracket. Most investors, however, will have an investment horizon greater than twenty years.

Of course, specific client account considerations, such as embedded capital gains, should be factored into any analysis of tax-deferred versus taxable account allocation.

APPENDIX

Approximating Tax Liability

The calculations in the Exhibit illustrate how tax liability can be approximated without the benefit of a computer model, assuming an investor in the 39.6% income tax bracket.

EXHIBIT CALCULATIONS					
One Year	Emerging Markets	Large-Cap (A)	Small-Cap	International	Bonds (TE)
1. Beginning Market Value	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
2. Ending Market Value	\$1,150	\$1,110	\$1,126	\$1,100	\$1,042
3. Turnover (%)	40%	60%	40%	40%	N/A
4. Realized Gains	\$60	\$51	\$46.40	\$40	\$42
5. Percent Gains – short-term	20%	30%	20%	20%	N/A
6. Taxes (taxable)	\$14.35	\$23.10	\$14.96	\$11.82	\$0
7. Taxes (tax-deferred)	\$455.40	\$439.56	\$445.90	\$435.60	\$412.63
8. Average Tax Liability	\$234.88	\$231.33	\$230.43	\$223.71	\$206.32

1. Beginning market value represents after-tax dollars in taxable accounts; pretax dollars in tax-deferred accounts.
2. (Beginning market value) + (Total return) = \$1,000 + \$150 = \$1,150.
3. From assumptions.
4. For taxable account, (Total return – yield = Capital appreciation) Turnover = \$150 x 0.4 = \$60.
5. From assumptions.
6. (Realized gains) (Percent gains – short-term) (39.6 percent income tax rate) = \$60 x 0.20 x 0.396 = \$4.75; plus (Realized gains) (1 – Percent gains - short-term) (20% capital gains tax rate) = \$60 x 0.80 x 20% = \$9.60; plus (Yield) (39.6 percent income tax rate) = \$60 x 0 x 0.396 = \$0 + \$9.60 + \$4.75 = \$14.35.
7. (Ending market value) (39.6 percent income tax rate) = \$1,150 x 0.396 = \$455.40.
8. (Tax liability [tax-deferred]) + (Tax liability [taxable])/2 = \$14.35 + \$455.40/2 = \$234.88.

Although the large-cap stocks appear to generate a higher tax liability in a taxable account compared to other asset classes, this higher tax liability is partially offset by a lower tax liability in a tax-deferred account. This difference occurs as a result of a higher percentage of short-term gains that would be taxed at the higher income tax rate, which remains the same in a tax-deferred account, where all the assets are taxed at the higher income tax rate. In other words, a greater portion of realized gains are taxed at the 39.6% income tax rate, which is a detriment in a taxable account, but a benefit in a tax-deferred account.

SUMMARY

Over longer investment horizons, assets with the highest tax liability based on total return, turnover, and yield should be invested in tax-deferred accounts. Over shorter investment horizons, assets with the highest income yield should be invested in tax-deferred accounts. For investors in the highest tax brackets, large-cap stocks held in tax-deferred accounts should maximize pretax returns, ignoring turnover rates, while those held in taxable accounts should focus on tax-efficiency, or maximizing after-tax returns.

ENDNOTE

*See Brenner [1998]; Clash [1996]; Shoven [1998]; "Taxable versus Tax-Deferred Accounts" [1996]; "Where does Tax Deferral Do the Most Good?"; and Garland [1997].

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