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**MAXIMIZING LONG-TERM WEALTH ACCUMULATION:**

IT'S NOT JUST ABOUT "WHAT" INVESTMENTS TO MAKE, BUT ALSO "WHERE" TO MAKE THEM

Robert M. Dammon, *Carnegie Mellon University*

James Poterba, *Massachusetts Institute of Technology*

Chester S. Spatt, *Carnegie Mellon University*

Harold H. Zhang, *University of Texas at Dallas*

In this article, academic researchers discuss the advantages of placing equities in taxable accounts and taxable bonds in tax-deferred accounts in order to maximize the tax efficiency of one's overall portfolio. Robert Dammon, Chester Spatt, and Harold Zhang co-authored a paper on this topic of asset location that won the 2004 TIAA-CREF Paul A. Samuelson Award. Their research indicates that the relative proportions of taxable and tax-deferred wealth affect one's overall optimal asset allocation. James Poterba also has researched asset location issues such as different investment horizons and different tax rates during accumulation and distribution phases. The four academic researchers discuss their findings and implications for individual investors in an interview with TIAA-CREF Institute Associate Director Mimi Lord.

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## >>> EXECUTIVE SUMMARY

Individuals who are saving for retirement are likely to know that the level of savings and the asset allocation of their savings are two very important factors affecting wealth accumulation. Another factor called asset location — which refers to the placement of certain types of assets in tax-deferred accounts and other types of assets in taxable accounts — is far less understood

The winners of the 2004 TIAA-CREF Paul A. Samuelson Award tackled this issue head-on, and concluded that equities are far better suited for taxable accounts than for tax-deferred accounts, and that bonds are far better suited for tax-deferred accounts than for taxable accounts. The reason for this preference is the different tax treatment of equity investments compared to fixed-income investments. Other research findings include:

- Choosing the right asset location for a pair of asset classes is more important when the tax rate differential between the two types of assets is greater and when the rate of return on the relevant assets is high.
- The relative proportions of taxable and tax-deferred wealth are an important factor in determining one's optimal asset allocation. According to the Samuelson award-winning authors, other factors being equal, an investor's optimal equity allocation will be higher when a larger proportion of his/her total wealth is held in taxable accounts, and that his/her optimal bond allocation will be higher if the bulk of his/her wealth is held in tax-deferred accounts.
- The ideal situation occurs when the desired asset allocation is reached by investing the entire tax-deferred account in bonds and the entire taxable account in equities. More often, the proportions of financial assets don't match up neatly with the desired asset allocations, and so adjustments may be needed. The authors state that for maximum tax efficiency, individuals should not hold mixed portfolios of equities and bonds in both their taxable and tax-deferred accounts.

## >>> INTRODUCTION

The Samuelson award-winning economists — Robert Dammon and Chester Spatt of Carnegie Mellon University, and Harold Zhang of the University of Texas at Dallas — enter new territory in their analysis of the interplay between the relative percentages of an investor's wealth in tax-deferred accounts versus taxable accounts, and the optimal asset allocation. The notion that one's relative proportions of tax-deferred and taxable wealth should influence one's overall asset allocation is a rather startling proposal for most financial advisors and their clients. Typically, investors are advised to establish an asset allocation — based predominantly on their risk profiles — and obtain that allocation with little or no consideration to asset location or the relative size of the taxable and tax-deferred accounts.

The following discussion involves the Samuelson winners and another prominent economist, James Poterba of the Massachusetts Institute of Technology,

and attempts to shed further light on the factors that affect asset location decisions between taxable and tax-deferred accounts. Poterba has written several papers that examine the interplay between the investor's tax rates during the accumulation phase and the distribution phase, the rates of return on bonds and on equities, and the investor's investment horizon. Poterba, like Dammon and Zhang, is a TIAA-CREF Institute Fellow and is also the recipient of the 2004 TIAA-CREF Samuelson Certificate of Excellence for research on the U.K. annuity market. He was appointed by President Bush earlier this year to serve on a panel for tax reform. Spatt currently is serving a two-year assignment as Chief Economist at the Securities and Exchange Commission (SEC). He has indicated that his views do not reflect those of the Commission, the Commissioners, or his colleagues on the staff of the SEC. The interview was conducted by TIAA-CREF Institute Associate Director Mimi Lord via e-mail exchanges with the economists.

## &gt;&gt;&gt; INTERVIEW

**Lord:** Robert, Chester and Harold — let's start with a question for you. You indicate that the difference in tax treatment for equities and fixed income is the basis for your recommendation to put equities in taxable accounts and taxable bonds in tax-deferred accounts. Will you explain how the changes in *The Jobs and Growth Tax Relief Reconciliation Act of 2003* (JGTRRA) affected this recommendation?

**Dammon, Spatt and Zhang:** The recommendation to hold equities in taxable accounts and bonds in tax-deferred accounts is driven by the higher effective tax rate on bond returns (interest) than on equity returns (dividends and capital gains). Prior to the 2003 JGTRRA, interest and dividends were both taxed as ordinary income, while long-term capital gains were taxed at a lower rate of 20% for most investors. The 2003 JGTRRA reduced tax rates across the board, but did so in a way that further increased the preferential treatment of equities relative to bonds. Under the 2003 JGTRRA, dividends and long-term capital gains are taxed at a maximum rate of 15%, while interest income is still taxed at ordinary income rates, which go up to 35% in the highest bracket. These changes have made our recommendation to hold equities in taxable accounts and bonds in tax-deferred accounts even more valuable for building after-tax wealth.

**Lord:** Did you feel strongly about your position even before the tax changes?

**Dammon, Spatt and Zhang:** We have always felt strongly about our asset location recommendation. Since dividends and interest income were taxed as ordinary income prior to the 2003 JGTRRA, the main source of the tax advantage for equities was due to the preferential treatment of capital gains. Not only are long-term capital gains taxed at lower rates than interest income, but also the tax on capital gains can be deferred until the stock is sold. If the stock is held until death, the tax on any embedded capital gains is completely forgiven through the reset (or basis step-up) provision of the tax code, whereby the tax basis of all assets are stepped up to the current market price. The investor also has the ability to realize capital losses to reduce taxable income up to \$3,000 per year

(with any excess carried forward to future years). The lower tax rate on realized capital gains, combined with the ability to optimally time the realization of capital gains and losses, makes the taxable account an ideal place to hold equities. Bonds, on the other hand, should be held in the tax-deferred account to shelter the high tax rate on interest income.

**Lord:** This one is for you, Jim. Your paper, "Valuing Assets in Retirement Savings Accounts," does a good job of explaining how various factors affect the relative attractiveness of bonds and equities in taxable or tax-deferred portfolios. Please tell us how each of these factors — tax rates, rates of return, and investment horizons — affect the optimal location of assets.

**Poterba:** The guiding principle in asset location is maximizing the value of tax deferral, and that means putting the most heavily taxed assets in the tax-deferred account. The reason taxable bonds are naturally located in the tax-deferred account is because the marginal tax burden on income from bonds exceeds that on equities. Choosing the right asset location for a pair of asset classes is more important when the tax rate differential between the two types of assets is greater. This is precisely why the 2003 tax reform makes asset location a more important decision. Choosing the right asset location also makes more difference when the rate of return on the relevant assets is high. The benefit from correct asset location depends on the difference in the after-tax rate of return on the two relevant assets when they are held in a taxable account. Even if one asset is taxed at 10%, and the other at 50%, the difference in after-tax returns will be small if the average return on each of the assets is only 1%. When the return is higher, however, the gains from correct asset location are greater, even if the tax rates are lower. The same thing is true about investment horizon. The longer the horizon, the more is at stake in selecting the correct asset location. If an investor misallocates assets for only a year, the lost opportunity for higher after-tax returns may be modest. But if the same misallocation persists for several decades, the cost can be substantial.

**Lord:** Jim, you also mention in your paper that, in reality, the effective capital gains tax rate on equity appreciation in the taxable account is lower than the statutory rate. In your calculations, if the statutory

capital gains tax rate is 15%, you cut that in half to 7.5%. Please explain why you do this and how it affects the relative attractiveness of equities being placed in taxable accounts compared to tax-deferred accounts.

**Poterba:** There is an important difference between the tax treatment of interest and dividends and the taxation of capital gains. When a firm pays a dividend or a bond yields interest, the tax on each of these income flows is due in the year when the income is received. When a stock or a bond appreciates in value, however, an investor is not immediately taxed on the capital gain. Taxation is instead deferred until the date at which the investor sells the asset and realizes the gain. Between the time when the asset appreciates, and the time when it is sold, the government in effect provides the investor with an interest-free loan equal to the amount of the capital gains tax. If an investor holds an asset for many years, the value of this interest-free loan is substantial, and the tax burden on the accruing capital gain is correspondingly reduced. If the appreciated asset is held for many years before it is sold, the present discounted value of the ultimate tax payment may be much smaller than the nominal amount of the tax. This is one reason for reducing the effective tax rate to something less than the statutory tax rate.

The second reason that the effective capital gains tax rate is lower than the statutory rate is that under current tax rules, if an asset with an accrued capital gain is held until the death of the owner and then bequeathed, the recipient of the bequest receives this asset with a tax basis equal to its market value at the time of the donor's death, or, in some cases, six months after death. This treatment of capital gains at death, known as "basis step up," makes it possible for some capital gains to avoid taxation entirely, further reducing the effective capital gains tax rate.

**Lord:** As a follow-up, Jim, tell us how a different income tax rate during the accumulation phase and the distribution phase affects the relative value of bonds and equities in tax-deferred accounts versus taxable accounts.

**Poterba:** The primary effect of changes in the tax rate on ordinary income between the time when an investor is contributing to the tax-deferred account, and the time when funds are being withdrawn from

such an account, is on the incentive to save through such an account, rather than on asset location. If the ordinary income tax rate is lower when the investor is retired than when she is working, then investing in a tax-deferred account, regardless of whether it is a 401(k), a 403(b), or a tax-deductible IRA, offers an important opportunity for tax minimization. If you can defer tax on a dollar of earnings today, and avoid a 35% marginal tax burden, and withdraw the assets in your taxable account in ten years, when your marginal tax rate is 25%, you are effectively reducing the tax burden on your current earnings. You are also earning tax-free returns on the account balance during the interim, but that is true regardless of whether the tax rate is the same or different when contributions are made and withdrawals are taken. When the tax rate falls between the time of contribution and the time of withdrawal, tax-deferred saving is more attractive than when the tax rate is stable. There are situations, however, in which the tax rate can be higher in retirement than while working. This makes tax-deferred saving less attractive than it otherwise would be, but if returns are high enough and the deferral horizon is long enough, it can still make sense to hold assets in a tax-deferred account.

**Lord:** Let's go back to Robert, Chester, and Harold. Your paper indicates that for a 35-year-old investor who doesn't borrow, the optimal equity allocation declines when larger percentages of total wealth are held in the tax-deferred account. You provide a numerical example in which the optimal overall equity allocation is about 70% when nearly all of the investor's financial assets are held in a taxable account. However, if most of the assets, say 70%, were held in the tax-deferred account, the optimal equity allocation for the overall portfolio would be less than 50%. I think you'd have trouble finding many financial advisors who actually follow this recommendation. How do you respond?

**Dammon, Spatt and Zhang:** The fact that the optimal asset allocation between bonds and stocks depends upon the distribution of wealth between the taxable and tax-deferred accounts should come as no surprise. It is the result of the investor attempting to exploit the tax sheltering opportunities offered by the tax-deferred account. Since bonds are taxed more heavily

than stocks, the ability to invest through tax-deferred accounts makes bonds look relatively more attractive as an investment vehicle. As a result, the investor will shift his/her portfolio more towards bonds as the proportion of total wealth held in tax-deferred accounts increases.

To make things concrete, suppose that equity offered an expected pre-tax return of 8% that was taxed at an effective rate of 10% (due to the deferral of capital gains) and bonds offered a pre-tax return of 5% that was taxed at 35%. On an after-tax basis, stocks would earn a 7.2% return and bonds would earn a 3.25% return. Clearly, bonds are relatively more attractive on a pre-tax basis ( $5\%/8\% = .625$ ) than on an after-tax basis ( $3.25\%/7.2\% = .45$ ). Therefore, the larger the proportion of total wealth held in tax-deferred accounts, which allow investors to earn pre-tax returns, the higher the proportion of total wealth allocated to bonds.

**Lord:** I understand that taxable bonds are more valuable in a tax-deferred account than in a taxable account. But over a long period of time, equities are still expected to provide higher returns than bonds, even after their gains are taxed at ordinary income rates when distributions occur out of the tax-deferred account. So why would an investor want to sacrifice accumulations with a lower equity allocation?

**Dammon, Spatt and Zhang:** Equities offer higher expected returns, but are riskier than bonds. Because of this higher risk, investors are typically not comfortable holding portfolios that are 100% invested in equities. Rather, to control the overall risk of their portfolios, investors typically hold diversified portfolios that include both bonds and stocks. The allocation between bonds and stocks will depend upon the risk-return tradeoff on these securities and the risk aversion of the investor. What our research shows is that the after-tax return per unit of risk makes equities relatively more appealing in the taxable account than in the tax-deferred account. For this reason, investors with a larger proportion of their total wealth in tax-deferred accounts will hold less equity and more bonds than they otherwise would if all of their wealth were in the taxable account.

**Lord:** Jim, do you agree with this position — that there could be such a significant shift in optimal asset allocation depending on the percentages of wealth held in the taxable and tax-deferred accounts? Why or why not?

**Poterba:** The share of wealth held in the tax-deferred account can certainly matter, precisely because the pre-tax and the after-tax returns are different. Over time, of course, an individual can affect the share of wealth held in the tax-deferred account. The increases in the limits on tax-deferred savings that were enacted as part of the 2001 tax reform legislation permit investors with a 401(k) plan to contribute \$14,000 per year to their plan. The limit is even higher for investors who are over 50 and therefore eligible for “catch-up” contributions. For many individuals with modest financial asset holdings, making limit contributions for several years will shift the balance of their overall portfolio toward tax-deferred assets.

**Lord:** Robert, Chester and Harold, you suggest that when the investor can borrow on his/her personal account it is optimal to invest the entire tax-deferred account in bonds and then adjust the portfolio holdings in the taxable account to achieve an optimal overall risk exposure. What if a large fraction of the individual's wealth is in the tax-deferred account and he/she does as you suggest, putting his/her entire tax-deferred account in taxable bonds and his/her entire taxable account in equities. If the individual needs to borrow a substantial amount in the taxable account to bring the overall equity allocation up to the desired level, it appears as if the investor's risk level has increased significantly. This could be especially problematic if the equities decline substantially and need to be liquidated in order to reduce debt levels. Two questions: (1) How does the interest rate on the borrowed funds affect the desirability of this strategy? (2) Does equity investing on margin really make sense for the average individual who may not fully understand his/her risk exposure in this strategy?

**Dammon, Spatt and Zhang:** Let's take the second question first. We do not believe that any individual should follow an investment strategy, or investment advice, that they do not fully understand. Borrowing on margin may very well fall into this category. However, borrowing on margin can be an effective way

for an individual to maximize the tax benefits of investing in tax-deferred accounts, so let's discuss how this strategy works and what risks are involved.

Consider an individual with \$100,000 of wealth in tax-deferred accounts (after subtracting out the taxes owed to the government on the accumulated balance) and another \$100,000 in taxable accounts. Suppose this individual wishes to hold an overall portfolio with 70% equity and 30% bonds. The optimal asset location strategy without borrowing would be for this individual to hold \$100,000 of equity in his/her taxable account and \$40,000 of equity and \$60,000 of bonds in his/her tax-deferred account. However, this asset location strategy does not take full advantage of the tax-deferred account because it is partially invested in preferentially-taxed equities. A more tax-efficient strategy is to hold \$100,000 of bonds in the tax-deferred account and \$140,000 of equity in the taxable account, financed with \$100,000 of personal wealth and \$40,000 of borrowing. Notice that the overall portfolio holdings are the same: 70% equity ( $\$140,000/\$200,000$ ) and 30% bonds, net of borrowing ( $(\$100,000 - \$40,000)/\$200,000$ ). Thus, the risk of the investor's overall portfolio is unchanged. The benefit of this new strategy is that it allows the investor to shelter income from taxes on an additional \$40,000 of investment. Without going into the details of the calculations, this strategy improves the after-tax return on the investor's overall portfolio as long as the after-tax borrowing rate,  $r_B(1-t_o)$ , is less than the difference between the pre-tax interest rate on taxable bonds and the tax on equity returns,  $(r_L - r_E t_E)$ . For example if the interest rate on taxable bonds is  $r_L = 5\%$ , the expected return on equity is  $r_E = 8\%$ , the ordinary tax rate is  $t_o = 35\%$  and the effective tax rate on equity is  $t_E = 10\%$  (due to the deferral of capital gains), then the borrowing strategy will be beneficial as long as the pre-tax borrowing rate,  $r_B$ , is less than 6.46% (i.e., a spread of 146 basis points over the lending rate).

Although the overall portfolio allocation and risk are unchanged under the borrowing strategy, there is additional liquidity risk for the investor. With more equity in the taxable account, there is the risk that a substantial decline in equity values may make it more difficult for the individual to fund his/her optimal consumption plans. For example, a decline of 50% in the value of equity would reduce the total wealth of

our investor to \$130,000 under both the borrowing and no-borrowing strategies. However, the split of wealth between the taxable and tax-deferred accounts would be different. Under the borrowing strategy there is only \$30,000 left in the taxable account (after paying off the borrowing) and \$100,000 in the tax-deferred account. Under the no-borrowing strategy there is \$50,000 left in the taxable account and \$80,000 in the tax-deferred account. This liquidity risk in the taxable account is not a problem for individuals who are older than 59½ who can access their tax-deferred accounts without penalty. For individuals younger than 59½, however, access to the tax-deferred account may involve a 10% penalty for early withdrawal. Thus, younger individuals with the bulk of their wealth invested in tax-deferred accounts, and with little or no ability to borrow, may consider reducing their contributions to the tax-deferred account, or reducing their overall exposure to equity, to build more wealth in the taxable account to avoid these liquidity problems.

**Lord:** Jim, does any of your research address the greater risk of the taxable account if it's invested mainly in equities? And how do you address the investor's possible need for a liquidity reserve in the event of unforeseen expenses?

**Poterba:** I have not explicitly modeled the potential risk of a liquidity shortfall. In assessing such risk, however, one should remember that by paying the 10% penalty tax for withdrawals prior to age 59½, the investor can always withdraw assets from the tax-deferred account and cover expenses that would otherwise be paid for with funds in the taxable account. There are two costs to having to make an early withdrawal from the tax-deferred account: the penalty tax and the foregone future opportunity to accumulate on a pre-tax basis in the tax-deferred account. If an individual withdraws funds from a tax-deferred account to cover a financial need, and then increases contributions after the financial need passes to rebuild the tax-deferred account balance, then the 10% penalty tax provides a rough upper bound on the potential cost of using the leverage strategy to increase holdings of taxable assets in the tax-deferred account.

**Lord:** Here's a question for both parties. Are there any situations where you'd think it's appropriate for an investor to place tax-inefficient equity mutual funds — such as ones with high yields or sizable capital gains each year — in a tax-deferred account?

**Dammon, Spatt and Zhang:** This is an issue we addressed directly in our research. What we found was somewhat surprising. Using arbitrage arguments, we showed that holding equities in taxable accounts and bonds in tax-deferred accounts is the optimal asset location strategy even if capital gains are realized and taxed on an annual basis, as long as the tax rate on capital gains is less than that on interest income. This implies that even actively-managed mutual funds that generate large capital gains (losses) each year should be held in taxable accounts and bonds in tax-deferred accounts. The asset location decision is a matter of indifference only if capital gains are fully taxed each year (i.e., no deferral) and dividends, capital gains, and interest are all taxed at the same rate.

One type of equity security that is more appropriate for tax-deferred accounts is a Real Estate Investment Trust (REIT). Dividend payments on REITs do not benefit from the lower dividend tax rate and REITs are forced to pay out all of their investment income each year as fully-taxable dividends. Therefore, REITs have much less potential for capital appreciation than other types of equity and earn most of their return in the form of fully-taxable dividend income. For this reason, they are better suited for the tax-deferred account.

**Poterba:** My research, in collaboration with John Shoven at Stanford and Clemens Sialm at the University of Michigan, offers a slightly different answer to this question. The difference is not the result of any disagreement about the fundamental analytical point that high-tax assets should be held in the tax-deferred account. It is due only to a different assumption about the set of assets available to investors. We consider the possibility of investing in tax-exempt bonds as well as taxable bonds.

My collaborators and I consider the asset location problem confronting an investor who can hold either taxable bonds or a tax inefficient equity mutual fund in her tax-deferred account, and who can hold taxable or

tax-exempt bonds, as well as a tax-inefficient equity fund, in her taxable portfolio. We also consider the same problem when the equity mutual fund is an index fund. Our analysis of the tax-inefficient fund is designed to reflect the reality that many households invest in high-cost, high-turnover, tax-inefficient mutual funds in both their taxable and tax-deferred accounts.

If the taxable and tax-exempt bonds are equally risky, a strong assumption to be sure, then there are two assets that offer the same fixed-income payoff structure, but that do so with different tax consequences. If the investor purchases taxable bonds, she pays interest income tax at her marginal federal income tax rate. If she purchases a tax-exempt bond, she pays no taxes. Instead, she pays an “implicit tax” because the interest rate on the tax-exempt bond is lower than that on a taxable bond. If the tax-exempt interest rate,  $r_{TE}$ , is exactly  $r_L(1-t_o)$ , the investor's after-tax return on taxable bonds, then in the taxable account, taxable bonds and tax-exempt bonds are perfect substitutes. It is appropriate to hold taxable bonds in the tax-deferred account, and equities outside the tax-deferred account, so long as the tax burden on interest income exceeds the tax burden on the available equity investments.

The situation is somewhat different if the yield on tax-exempt bonds is greater than  $r_L(1-t_o)$ , so that the after-tax return for this investor is greater in tax-exempt bonds than in taxable bonds. The implicit tax rate on tax-exempt bonds is the difference between the taxable and the tax-exempt interest rates, as a share of the taxable rate:  $(r_L - r_{TE})/r_L$ . If this implicit tax rate is below the tax burden on the tax-inefficient equity mutual fund that the investor can hold in the tax-deferred account, the standard logic of putting the high tax asset in the tax-deferred account points toward holding the equity mutual fund in the retirement account.

There is one open question concerning this argument, and it involves the interpretation of the implicit tax rate. The argument I just presented assumes that taxable and tax-exempt bonds are equally risky. If this is not the case, and if part of the reason tax-exempt bonds yield more than  $r_L(1-t_o)$  is because they are more risky than taxable Treasury bonds, either

because of default risk or because of the risk of changes in the tax system, then an investor will not have the same portfolio if he holds taxable bonds in his tax-deferred account or tax-exempt bonds in his taxable account. The explanation of the narrow yield spread between taxable and tax-exempt bonds is a long-standing puzzle in financial economics. Its resolution is important for asset location.

The finding that tax-inefficient equity funds should be held in a tax-deferred account does not apply when investors have access to a tax-efficient equity index fund. In that case, the standard recommendation to hold highly taxed fixed income securities in the tax-deferred account would carry through.

**Lord:** Would you ever think it's appropriate for an investor to hold municipal bonds or money market funds in his/her taxable account?

**Poterba:** Tax-exempt bonds in a taxable account make sense for an investor who wants to hold a fixed income asset and whose marginal tax rate is higher than the implicit tax rate associated with the tax-exempt bond. It is difficult to think of a justification for holding tax-exempt bonds in the tax-deferred account.

Money market funds provide a way of earning very low real returns, with very low risk. They are a very conservative asset, and they are also heavily taxed. This would suggest locating such investments in a tax-deferred account, although doing so would deprive investors of the transactions function that probably justifies most investments in these funds. The decision to hold money market funds in a taxable account is unlikely to be driven purely by return or tax considerations, but by a desire for liquidity.

**Dammon, Spatt and Zhang:** We are in agreement with Jim that high-tax-bracket investors may find it beneficial to hold tax-exempt bonds instead of taxable bonds in their taxable accounts, but only if they hold all taxable bonds in their tax-deferred accounts. In general, we do not believe that it is optimal to hold tax-exempt bonds in taxable accounts if the investor holds equity in his/her tax-deferred account, even if the equity is highly tax inefficient.

In our paper, we examine whether it might be optimal to hold tax-exempt bonds in the taxable account and

actively-traded tax-inefficient equity mutual funds in the tax-deferred account. We find that this strategy can be optimal if the effective tax rate on the equity mutual fund is higher than the implicit tax rate on tax-exempt bonds. For example, if the equity mutual fund invests only in non-dividend-paying stocks and realizes 100% of its capital gains each year, 50% short-term and 50% long-term, then its effective tax rate is  $.5(35\%) + .5(15\%) = 25\%$ . Consequently, if the implicit tax rate on tax-exempt bonds is less than 25% it would be beneficial to hold tax-exempt bonds in the taxable account and the tax-inefficient equity mutual fund in the tax-deferred account.

However, before jumping into the tax-inefficient equity mutual fund in the tax-deferred account and tax-exempt bonds in the taxable account the investor should also consider whether holding a tax-efficient index fund in the taxable account and taxable bonds in the tax-deferred account is a better strategy. When we considered these two alternative strategies side-by-side we discovered that in order for the former strategy to prevail, it is necessary for the tax-inefficient equity mutual fund to outperform the tax-efficient index fund on a pre-tax, risk-adjusted, basis by more than the difference in the yields on taxable and tax-exempt bonds. For example, if the yield on taxable bonds is 5% and the yield on tax-exempt bonds is 3.75%, then the tax-inefficient equity mutual fund must outperform the tax-efficient index fund by more than 125 basis points per year (before taxes, transaction costs, and management fees). Given the well-documented underperformance of actively-managed equity mutual funds, we conclude that investors are better served by holding tax-efficient index funds in taxable accounts and taxable bonds in tax-deferred accounts.

We agree with Jim that holding taxable money market funds in a taxable account is also tax-inefficient, but may be necessary for transaction purposes.

**Poterba:** The key difference between our results with regard to tax-inefficient mutual funds is a result of our different assumptions about the availability of a tax-efficient mutual fund in the taxable account. When Shoven, Sialm, and I allow for investment in equity index funds, our findings are aligned with those of Robert, Chester, and Harold. When we assume that an investor is restricted to holding tax-inefficient equity

funds in both the taxable and the tax-deferred account, however, we find that the strategy of holding the equity mutual fund in the tax-deferred account sometimes yields higher retirement wealth than the more conventional strategy. Whether it makes sense to constrain the investor's opportunities for equity investment to only high-tax funds is debatable. Such funds are widely held in taxable and tax-deferred accounts, even when index funds are available and offer much lower expenses. Our analysis with tax-inefficient funds can therefore be thought of as applying to the subset of households who choose to hold their equity investments through these funds.

**Lord:** Robert, Chester and Harold, at one point in your paper you indicate that it may be desirable for a young investor with substantial tax-deferred wealth to forego further contributions into tax-deferred accounts in order to increase the investment value in the taxable account. But nearly all the advice given to young investors stresses the importance of maximizing tax-deferred savings in order to get the longest time possible for compounding pre-tax returns. What kinds of situations justify reducing or eliminating contributions to one's tax-deferred account?

**Dammon, Spatt and Zhang:** We agree that investing as much as possible in tax-deferred accounts is valuable for all investors, especially for young investors who have the benefit of a longer time horizon for compounding pre-tax returns. Consider, for example, a 30-year-old investor with perhaps 40 years remaining before his/her retirement funds will need to be liquidated. One dollar invested in bonds in a tax-deferred account earning a pre-tax return of 5% will grow to \$7.04 after 40 years. This same dollar invested in bonds in a taxable account earning an after-tax return of 3.25% will grow to only \$3.59 after 40 years. (Here we assume that the dollar investments in both the taxable and tax-deferred accounts are on an after-tax basis. If not, then the final payoffs will need to be multiplied by  $(1-t_0)$  in both accounts.) This implies that a dollar invested in the tax-deferred account is worth nearly twice as much as a dollar invested in the taxable account for this investor.

The benefits of tax-deferred investing, however, are dramatically reduced if the investor finds it necessary

to withdraw funds from the tax-deferred account before retirement. If the funds are withdrawn prior to age 59½ the investor will pay ordinary income taxes and a 10% penalty on the pre-tax amount of the withdrawal. Thus, investors who may need access to their savings prior to reaching age 59½ should make a comparison between the tax benefits of tax-deferred savings and the likelihood and costs of early withdrawal. Investors with a high probability of needing to liquidate their savings to finance consumption (e.g., purchase of a house, education expenses, or health-related expenses) prior to age 59½ may find it beneficial to reduce contributions to their tax-deferred accounts and begin saving in their taxable accounts.

**Lord:** Jim, what is your opinion about this? Your papers appear to recommend consistently that young investors should maximize contributions to their tax-deferred accounts. Are there exceptions to this general rule?

**Poterba:** Even when funds will have to be withdrawn before age 59½ and subject to the penalty tax, it can still make sense to contribute to a tax-deferred account. Inside build-up, the chance to accumulate assets at the before-tax rate of return, is very valuable. Consider a taxable bond that yields 7% per year, and assume that interest is taxed at a 25% tax rate ( $t_0$ ). If this asset is held in a tax-deferred account for more than nine years, the after-tax value of the proceeds even after paying the 10% penalty tax on withdrawal will exceed the after-tax value of an investment in the taxable account.

**Lord:** Back to the subject of long investment horizons, Jim, please mention some strategies for owners of tax-deferred accounts to stretch out the timeframe for taking distributions and incurring tax liabilities.

**Poterba:** Before turning to retirement, let me mention that a key recommendation for maximizing the value of retirement assets is to avoid making distributions before you reach retirement. That means keeping assets in tax-deferred accounts when you change jobs, and resisting the temptation to take lump-sum distributions or hardship withdrawals. For someone who reaches retirement with a sizable account balance, and

who does not need to make withdrawals to finance living expenses, there is no reason to take any withdrawals prior to the start of mandatory distributions at age 70½. For someone over the age of 70½, the tax code specifies a “minimum distribution requirement.” This is the minimum annual withdrawal from the investor’s tax-deferred accounts. The required minimum distribution rises as a share of the account’s value as the account owner ages. At age 70, for example, this required distribution is 3.6% of account value for an account holder who does not have a primary beneficiary who is more than ten years his or her junior. The minimum distribution requirement rises to 6.6%, for example, at age 85.

The withdrawal period for assets in tax-deferred accounts can be stretched beyond the lifetime of the investor who accumulated the assets through careful choice of beneficiaries. Account holders who follow a minimum distribution strategy will die with some assets still in their tax-deferred accounts. Account holders can structure their wills, and their beneficiary designations in their tax-deferred accounts, to ensure that these residual assets are transferred to younger and longer-lived beneficiaries. In some cases these beneficiaries may be able to keep the assets in a tax-deferred account, while making annual withdrawals, for several decades.

A critical question about withdrawing assets from a tax-deferred account is whether these assets should be used to purchase an annuity. Your question about extending the lifetime of such accounts assumes that the account holder has chosen not to annuitize. An annuity makes the question of extending the lifetime of payouts moot; the payouts continue for as long as the annuitant, or annuitants, are alive, or until the end of the guarantee period if the annuity provides certain payouts for a fixed number of years.

**Lord:** Last question. What if future tax reform shrinks or even closes the gap between the ordinary income tax rate and the capital gains tax rate — how would that affect your recommendations? Robert, Chester and Harold?

**Dammon, Spatt and Zhang:** Well, it seems unlikely that this would happen since long-term capital gains have historically been taxed at favorable rates relative

to ordinary income. (One exception is the 1988-90 period in which the tax rate on capital gains and ordinary income were the same.) However, in order for asset location to be a matter of indifference for investors, two things must happen. First, the tax rate must be the same on all sources of investment income (i.e., interest, dividends, short-term capital gains, and long-term capital gains). Second, all capital gains and losses must be taxed on an accrual basis so that investors do not have the opportunity to defer the tax on capital gains. If either of these requirements is violated, then asset location will not be a matter of indifference, but rather it will be optimal to hold equities in taxable accounts and bonds in tax-deferred accounts. Of course, the magnitude of the benefits of the optimal asset location policy will still depend upon the differential in the effective tax rates on equity and bond returns.

**Lord:** Jim?

**Poterba:** I agree. The one point I would emphasize concerns the tax treatment of capital gains, and the important distinction between an accrual-based tax, in which gains are taxed in the year when they accrue, and our current realization-based system. With a realization-based system investors benefit from deferring tax on their gains, and this makes the effective capital gains tax rate lower than the statutory rate. So long as equities generate a greater share of their return in the form of capital gains than bonds do, even when the statutory tax rates on interest, dividends, and capital gains are the same, the effective tax burden on equities will be below that on taxable bonds. This makes asset location an important issue for taxable investors.

**Lord:** Fascinating discussion — thanks very much.

## >>> ABOUT THE DISCUSSANTS

**Robert M. Dammon** is Professor of Financial Economics at the Tepper School of Business, Carnegie Mellon University.

**James Poterba** is the Mitsui Professor of Economics at the Massachusetts Institute of Technology, and the Program Director for Public Economics at the National Bureau of Economic Research.

**Chester S. Spatt** is the Mellon Bank Professor of Finance, and Director for Financial Markets at the Tepper School of Business, Carnegie Mellon University. He currently is on a two-year assignment as Chief Economist, Securities and Exchange Commission.

**Harold H. Zhang** is Professor of Finance at the School of Management at the University of Texas at Dallas. Previously, he was Associate Professor of Finance at the Kenan-Flagler Business School at the University of North Carolina at Chapel Hill.

## >>> ADDITIONAL INFORMATION

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# TIAA-CREF institute

730 Third Avenue  
New York, NY 10017-3206  
Tel 800.842.2733 ext 6363  
[tiaa-crefinstitute.org](http://tiaa-crefinstitute.org)



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