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# Tax-Efficient Withdrawal Strategies

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*The authors considered an individual investor who holds a financial portfolio with funds in at least two of the following accounts: a taxable account, a tax-deferred account, and a tax-exempt account. They examined various strategies for withdrawing these funds in retirement. Conventional wisdom suggests that the investor should withdraw funds first from the taxable account, then from the tax-deferred account, and finally from the tax-exempt account. The authors provide the underlying intuition for more tax-efficient withdrawal strategies and demonstrate that these strategies can add more than three years to the portfolio's longevity relative to the strategy suggested by the conventional wisdom.*

Suppose that an individual investor has funds in at least two of the following accounts: a taxable account; a tax-deferred account (TDA), such as a traditional IRA; and a tax-exempt account (TEA), such as a Roth IRA. How should he withdraw funds from these accounts in retirement to maximize the longevity of his financial portfolio? According to the American Council for Capital Formation (1999), most industrialized and developing countries offer a TDA and some offer a TEA as well.[1] Thus, the question of how to form a tax-efficient withdrawal strategy is global in nature.

Vanguard (2013) has expressed the conventional wisdom: "Spend from your taxable account first.... Next, consider withdrawing money from your tax-deferred accounts.... Finally, withdraw money from tax-free accounts." This conventional wisdom has been advocated by the three giant mutual fund families (Vanguard 2013; Fidelity 2014; American Funds 2014) and by many others (for a partial list, see T. Rowe Price 2012; Updegrave 2013; Putnam Investments 2014; USAA 2014).[2] In this article, we demonstrate several facts. First, the order of withdrawal between the TDA and TEA is irrelevant under a flat tax structure. Second, we identify withdrawal strategies that can add years to the longevity of a financial portfolio under a progressive tax structure; the additional longevity for the most tax-efficient withdrawal strategy relative to the most tax-inefficient withdrawal strategy may be more than six years. Third, the additional longevity for the most tax-efficient strategy relative to the conventional wisdom strategy may be more than three years. Finally, the optimal withdrawal strategy is substantially different from the strategy espoused by the conventional wisdom.

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## TDA as Partnership

A tax-deferred account is best viewed as a partnership. A TDA is like a limited partnership in which the individual investor is the general partner and owns $(1 - t)$ of the partnership interest, where $t$ is the marginal tax rate when the funds are withdrawn in retirement. The government is effectively a limited partner and owns the remaining $t$ of the partnership. This concept is well established in the finance literature (e.g., Reichenstein 2001, 2006a, 2006b, 2007a, 2007b; Reichenstein and Jennings 2003; Dammon, Spatt, and Zhang 2004; Horan 2005, 2007a, 2007b; Horvitz 2005; Reichenstein, Horan, and Jennings 2012); we reiterate the concept here as the foundation of the withdrawal strategies that we examine in this article. Conceptually, we can separate each dollar in a TDA into $(1 - t)$ dollar of the investor's after-tax funds and $t$ dollar, which is the government's share of the current principal. In effect, the investor is the general partner and gets to decide where the funds are invested and when they are withdrawn, subject to required minimum distributions (RMDs). The government is the limited partner; when funds are withdrawn, the government receives $t$ of the withdrawal.

Prior research has examined the implications of this concept for several investment decisions. First, should investors save in a TEA (e.g., a Roth IRA) or a TDA (e.g., a traditional IRA)? Prior research on this issue includes Horan (2005); Waltenberger, Rothermich, and Reichenstein (2006); Reichenstein (2007a, 2008); and Reichenstein et al. (2012). For a discussion of how this concept can affect the calculation

 

of an individual investor's asset allocation, see Reichenstein and Jennings (2003), Reichenstein (2006a, 2008), and Horan (2007b). The asset location literature examines the issue of whether individual investors should hold stocks in taxable accounts and bonds in retirement accounts (i.e., TEAs and TDAs) or vice versa, while still attaining the target asset allocation (see Brunel 2001; Reichenstein and Jennings 2003; Reichenstein 2006a, 2008; Horan 2007a; Horan and Zaman 2008; Meyer and Reichenstein 2013b). This article examines the implications for withdrawal strategies in retirement. Prior work on this issue includes Horan (2006a, 2006b), Reichenstein (2006b, 2006c, 2008), and Meyer and Reichenstein (2013a).

## Individual Investor Returns across Savings Vehicles

The conventional wisdom is based on the following idea: an individual investor generally pays a higher tax rate on returns on assets held in taxable accounts than on returns on assets held in tax-favored retirement accounts (i.e., TDAs and TEAs). Moreover, the conventional wisdom holds that funds in TEAs grow tax exempt whereas funds in TDAs grow only tax deferred. According to the conventional wisdom, the individual investor receives all the returns on assets held in a TEA but only part of the returns held in a TDA. So, the individual investor should withdraw funds from the least tax-favored account (the taxable account) first, followed by the TDA, while preserving funds in the most tax-favored account (the TEA) until last.

But there is a flaw in this conventional wisdom. In particular, properly viewed, the after-tax value of funds in both the TEA and the TDA grows tax exempt. In our study, we considered two assets—stocks and bonds (or any other fixed-income asset)—and three savings vehicles: TEA, TDA, and taxable account. We found that individual investors effectively receive all the returns on assets held in both TEAs and TDAs whereas they generally receive only part of the returns on assets held in taxable accounts.

Suppose an investor holds a TEA with $1 of after-tax funds, and these funds are invested in an asset earning $r$ per year, where $r$ is the pretax rate of return. The underlying asset can be bonds or stocks. After $n$ years, the investor withdraws the funds from the TEA and spends them. The after-tax value grows at the pretax rate of return, from $1 today to $(1 + r)^n$ dollars at withdrawal, $n$ years from today. Because the investor receives all the asset's returns, the effective tax rate is zero.

Next, suppose an investor holds a TDA with $1 of pretax funds. As explained earlier, this dollar can be conceptually separated into $(1 - t)$ dollar of the investor's after-tax funds, with the government effectively owning the remaining $t$ dollar. The underlying asset can be bonds or stocks, and these funds earn a geometric average return of $r$ per year for $n$ years. After $n$ years, the investor withdraws the funds from the TDA and spends them. At withdrawal in $n$ years, the pretax value of the TDA is $(1 + r)^n$ dollars. The government takes $t$ of this amount in taxes, and the investor receives $(1 - t)(1 + r)^n$ dollars after taxes. The investor's after-tax funds grow from $(1 - t)$ today to $(1 - t)(1 + r)^n$ in $n$ years; that is, the investor's after-tax funds effectively grow tax exempt at the asset's pretax rate of return. Properly viewed, the effective tax rate is zero.

Finally, consider a taxable account with a beginning market value and cost basis of $1. If the underlying asset is a taxable bond (or other fixed-income asset), its after-tax value grows at $r(1 - t_i)$, where $t_i$ is the marginal tax rate for that year. The investor receives $(1 - t_i)$ of the return, and the government receives the remainder.

The analysis for stocks held in a taxable account is more complex. Again, consider a taxable account with a beginning market value and cost basis of $1. The pretax return, $r$, consists of the dividend yield, $div$, and the capital gain, $cg$. The dividends are subject to taxes each year unless the taxpayer is in the 10% or 15% tax bracket. Thus, the investor generally receives only part of this return, with the government getting the remainder. Capital gains grow tax deferred until realized, but once realized, the government generally receives part of the return; that is, the investor generally does not receive the entire return.[3]

In summary, properly viewed, individual investors receive all returns on assets held in a TEA or TDA but generally receive only part of the returns on assets held in taxable accounts. Thus, as a rule of thumb, withdrawals should come from the taxable account before either a TEA or a TDA. So, contrary to the conventional wisdom, the TEA is not more tax advantaged than the TDA. As we demonstrate in the next section, in the presence of a flat tax rate, the order of withdrawal between a TEA and a TDA is irrelevant. Furthermore, as we demonstrate later in the article, a key to a tax-efficient withdrawal strategy is to withdraw funds from TDAs such that the investor minimizes the average of the marginal tax rates on these withdrawals.

## Withdrawal Strategies with a Flat Tax Structure

Under a flat tax structure, withdrawals should come from the taxable account first, but the withdrawal order between the TDA and the TEA is irrelevant. To hold everything else constant, we assume that the underlying asset is the same in all accounts. The

underlying asset is a bond earning a 4% pretax rate of return, and the flat tax rate is 25%. The investor spends $45,000 each year, which requires after-tax funds. For simplicity but without loss of generality, we assume that inflation is zero.

In **Table 1**, we compare two pairs of withdrawal strategies. In the first pair, the first strategy withdraws funds from a TEA followed by a taxable account and the second strategy withdraws funds in the reverse order. At the commencement of his retirement, the investor has $379,589.92 in a TEA and $513,105.56 in a taxable account. In Strategy 1A, he withdraws $45,000 at the beginning of Year 1 from the TEA. The year-end value is thus $347,973.52, or ($379,589.92 – $45,000)(1.04). He withdraws $45,000 from the TEA at the beginning of each year until it is exhausted upon the withdrawal of the remaining $45,000 at the beginning of Year 10. The taxable account has grown

**Table 1. Longevity Comparisons of Withdrawal Strategies under a Flat Tax Rate**

| | Strategy 1A | | Strategy 1B | | Strategy 2A | | Strategy 2B | |
|---|---|---|---|---|---|---|---|---|
| Year | TEA | Tax. Acct. | TEA | Tax. Acct. | TDA | Tax. Acct. | TDA | Tax. Acct. |
| 0 | $379,590 | $513,106 | $379,590 | $513,106 | $506,120 | $513,106 | $506,120 | $513,106 |
| 1 | 347,974 | 528,499 | 394,774 | 482,149 | 463,965 | 528,499 | 526,365 | 482,149 |
| 2 | 315,092 | 544,354 | 410,564 | 450,263 | 420,123 | 544,354 | 547,419 | 450,263 |
| 3 | 280,896 | 560,684 | 426,987 | 417,421 | 374,528 | 560,684 | 569,316 | 417,421 |
| 4 | 245,332 | 577,505 | 444,067 | 383,594 | 327,109 | 577,505 | 592,089 | 383,594 |
| 5 | 208,345 | 594,830 | 461,829 | 348,752 | 277,794 | 594,830 | 615,772 | 348,752 |
| 6 | 169,879 | 612,675 | 480,302 | 312,864 | 226,505 | 612,675 | 640,403 | 312,864 |
| 7 | 129,874 | 631,055 | 499,514 | 275,900 | 173,166 | 631,055 | 666,019 | 275,900 |
| 8 | 88,269 | 649,987 | 519,495 | 237,827 | 117,692 | 649,987 | 692,660 | 237,827 |
| 9 | 45,000 | 669,486 | 540,275 | 198,612 | 60,000 | 669,486 | 720,366 | 198,612 |
| 10 | 0 | 689,571 | 561,886 | 158,220 | 0 | 689,571 | 749,181 | 158,220 |
| 11 | | 663,908 | 584,361 | 116,617 | | 663,908 | 779,148 | 116,617 |
| 12 | | 637,475 | 607,736 | 73,765 | | 637,475 | 810,314 | 73,765 |
| 13 | | 610,250 | 632,045 | 29,628 | | 610,250 | 842,727 | 29,628 |
| 14 | | 582,207 | 641,340 | 0 | | 582,207 | 855,120 | 0 |
| 15 | | 553,323 | 620,194 | | | 553,323 | 826,925 | |
| 16 | | 523,573 | 598,202 | | | 523,573 | 797,602 | |
| 17 | | 492,930 | 575,330 | | | 492,930 | 767,106 | |
| 18 | | 461,368 | 551,543 | | | 461,368 | 735,391 | |
| 19 | | 428,859 | 526,805 | | | 428,859 | 702,406 | |
| 20 | | 395,375 | 501,077 | | | 395,375 | 668,102 | |
| 21 | | 360,886 | 474,320 | | | 360,886 | 632,426 | |
| 22 | | 325,363 | 446,493 | | | 325,363 | 595,324 | |
| 23 | | 288,774 | 417,552 | | | 288,774 | 556,736 | |
| 24 | | 251,087 | 387,454 | | | 251,087 | 516,606 | |
| 25 | | 212,269 | 356,153 | | | 212,269 | 474,870 | |
| 26 | | 172,288 | 323,599 | | | 172,288 | 431,465 | |
| 27 | | 131,106 | 289,743 | | | 131,106 | 386,324 | |
| 28 | | 88,689 | 254,532 | | | 88,689 | 339,377 | |
| 29 | | 45,000 | 217,914 | | | 45,000 | 290,552 | |
| 30 | | 0 | 179,830 | | | 0 | 239,774 | |
| 31 | | | 140,223 | | | | 186,965 | |
| 32 | | | 99,032 | | | | 132,043 | |
| 33 | | | 56,194 | | | | 74,925 | |
| 34 | | | 11,641 | | | | 15,522 | |
| Longevity (years) | 30 | | 34.26 | | 30 | | 34.26 | |

*Note:* Year-end balances are rounded to the nearest dollar.

at the 3% after-tax rate of return, (4%)(1 – 0.25), and is worth $689,570.97, or ($513,105.56)(1.03)$^{10}$, at the end of Year 10. The investor withdraws $45,000 from the taxable account at the beginning of Year 11 and each year thereafter until it is exhausted upon the withdrawal of the remaining $45,000 at the beginning of Year 30. Because taxes are paid on returns each year, the withdrawals are tax-free returns of principal. This withdrawal strategy lasts precisely 30 years.[4]

In Strategy 1B, the investor withdraws funds from the taxable account first, followed by the TEA. At the beginning of Year 1, he withdraws $45,000 from the taxable account, and the remaining funds grow at the 3% after-tax rate of return. At the beginning of Year 14, he withdraws the remaining $29,628.23 from the taxable account and $15,371.77 from the TEA to meet his spending needs. Beginning in Year 15, he withdraws $45,000 from the TEA. At the beginning of Year 35, he withdraws the remaining $11,641.45 from the TEA, which meets 26% of that year's spending goal. In Strategy 1B, his portfolio lasts 34.26 years, which is 4.26 years longer than in Strategy 1A. This additional longevity is due to the growth of the TEA's after-tax value at the 4% pretax rate of return instead of the taxable account's 3% after-tax rate of return.

In the second pair of withdrawal strategies, the first strategy withdraws funds from a TDA followed by a taxable account and the second strategy withdraws funds in the reverse order. At the commencement of his retirement, the investor has $506,119.89 in a TDA and $513,105.56 in a taxable account, where the initial TDA balance is the initial TEA balance divided by (1 – $t$), or 0.75. In Strategy 2A, he withdraws $60,000 of pretax funds from the TDA at the beginning of Year 1, and the year-end value is $463,964.69, or ($506,119.89 – $60,000)(1.04). The $60,000 pretax withdrawal meets the $45,000 after-tax spending goal. He withdraws $60,000 from the TDA at the beginning of each year until it is exhausted upon the withdrawal at the beginning of Year 10. As in Strategy 1A, the taxable account is worth $689,570.96 at the end of Year 10. The investor withdraws $45,000 from the taxable account at the beginning of Year 11 and each year thereafter until it is exhausted upon the withdrawal at the beginning of Year 30.

In Strategy 2B, the investor withdraws funds from the taxable account first, followed by the TDA. At the beginning of Year 1, he withdraws $45,000 from the taxable account, and the remaining funds grow at the 3% after-tax rate of return. As in Strategy 1B, at the beginning of Year 14, he withdraws the remaining $29,628.23 from the taxable account and $20,495.69 from the TDA, with the latter providing the remaining $15,371.77, or ($20,495.69)(1 – 0.25), of after-tax funds to meet his spending needs. Beginning in Year 15, he withdraws $60,000 from the TDA, which meets the spending goal. At the beginning of Year 35, he withdraws the remaining $15,521.94 of pretax funds from the TDA, which meets 26% of that year's spending goal. In Strategy 2B, his portfolio lasts 34.26 years, which is 4.26 years longer than in Strategy 2A. This additional longevity is due to the growth of the TDA's after-tax value at the 4% pretax rate of return instead of the taxable account's 3% rate of return.

Comparing Strategies 1A and 2A with Strategies 1B and 2B reveals that, for someone with a 25% flat tax rate, a TDA worth $\$x$ is equivalent to a TEA worth ($\$x$)(1 – 0.25). Stated differently, under a 25% flat tax rate, the TDA is like a partnership in which the government effectively owns 25% of the partnership. Furthermore, the after-tax value of these accounts effectively grows tax-free. The conventional wisdom calls for withdrawals from taxable accounts first, followed by TDAs and then TEAs. We have demonstrated that under a flat tax structure, taxable accounts should be exhausted before either TDAs or TEAs; the order of withdrawal between the TDA and TEA does not matter. This part of the conventional wisdom is indeed *wrong*!

## Withdrawal Strategies with a Progressive Tax Structure

It is possible to add years to the longevity of a financial portfolio by withdrawing funds in a tax-efficient manner. The additional longevity is due to two principles. First, the investor generally receives a smaller portion of the underlying asset's returns when the asset is held in a taxable account rather than in a TDA or TEA. Second, a TDA is essentially a partnership in which the government effectively owns $t$ of the principal, where $t$ is the marginal tax rate at withdrawal. One objective of a tax-efficient withdrawal strategy is to identify opportunities to withdraw funds from TDAs when those funds would be taxed at unusually low rates. For many retirees, these opportunities are likely to occur before RMDs begin and in years with large tax deductions, such as high medical expenses.

Suppose an investor retires at age 65 and has funds in both a taxable account and a TDA. If she follows the conventional wisdom, she would withdraw funds from her taxable account until it is exhausted. Because withdrawals from taxable accounts are usually mostly, if not entirely, tax-free withdrawals of principal, following the conventional wisdom often results in the retiree's being in an unusually low tax bracket before RMDs begin. The retiree should not lose the opportunity to withdraw funds from the TDA or convert funds from the TDA to the TEA during such years if these funds would be taxed at an unusually low rate.

A second circumstance in which a retiree may be in an unusually low tax bracket is when she has large tax-deductible expenses, such as medical costs. In those years, she will likely be in a low, if not zero, tax bracket. Although forecasting this circumstance presents a financial-planning problem (because no one knows for certain whether they will have such high-expense years), it is nevertheless desirable to try to save some TDA balances for this nontrivial possibility.

When withdrawing funds from a financial portfolio, one objective is to minimize the average of marginal tax rates on TDA withdrawals. Under a progressive tax structure, this goal can be accomplished by withdrawing funds from the TDA each year so long as these withdrawals are taxed at a low marginal rate and then making additional withdrawals from the taxable account until it is exhausted. After the taxable account has been exhausted, the retiree should withdraw funds from the TDA each year so long as these funds are taxed at a low marginal rate and then make additional withdrawals from the TEA. This strategy allows the investor to minimize $t$—the government's share of the TDA—and thus extend the longevity of her financial portfolio.[5] This strategy is recommended in Meyer and Reichenstein (2013a) and is Strategy 3 in our study. However, we present two additional withdrawal strategies that use Roth conversions and extend the longevity of the financial portfolio beyond that in Strategy 3. Neither of these new withdrawal strategies has been analyzed in prior research.

For our analysis, we used the 2013 federal tax brackets. In 2013, the personal exemption was $3,900, and the standard deduction for someone 65 or older at year-end was $7,600, or the $6,100 basic standard deduction plus the $1,500 additional standard deduction for age. Thus, the first $11,500 of adjusted gross income (AGI) was tax-free. In 2013, the tops of the 10%, 15%, and 25% tax brackets for a single taxpayer were $8,925, $36,250, and $87,850, respectively. So, a single retiree aged 65 or older could withdraw up to $47,750, or $11,500 + $36,250, from the TDA each year, with the withdrawals taxed at 15% or less. Although our example is for a single taxpayer, the same logic applies to married couples. For simplicity but without loss of generality, we assume that the inflation rate is zero so that the tax brackets remain constant and the reader may more easily follow the example. The retiree begins retirement with $916,505.12 in a TDA, $234,928.11 in a TEA, and $549,601.17 in a taxable account. The annual spending goal is $81,400. In the first four strategies, we assume that the asset is a taxable bond earning 4% interest. As discussed later in the article, in the fifth strategy, we also assume that the underlying asset earns a 4% geometric average return to ensure that this strategy does not contain a return advantage.

**Table 2** presents the results of the five withdrawal strategies. In Strategy 1, the retiree withdraws funds in the following order: TEA, TDA, taxable account. This withdrawal strategy is the opposite of the conventional wisdom strategy. By design, the portfolio lasts 30 years.

Strategy 2 follows the conventional wisdom. The retiree withdraws funds in the following order: taxable account, TDA, TEA. This strategy incorporates the principle that the taxable account grows least tax efficiently but does not incorporate the partnership principle. As we demonstrate later, the portfolio lasts 33.15 years under this withdrawal strategy.

In Strategy 3, in the retiree's early retirement years, she withdraws funds each year from the TDA to the top of the 15% tax bracket and then withdraws additional funds from the taxable account to meet her spending goal. After the taxable account has been exhausted, she withdraws funds each year from the TDA to the top of the 15% tax bracket and then withdraws additional funds from the TEA to meet her spending goal. This strategy applies both principles, and the portfolio lasts 34.37 years.

In Strategy 4, the retiree converts $47,750 at the beginning of Years 1–7 from the TDA to the TEA—for example, a conversion from a 401(k) to a Roth IRA—which takes her taxable income to the top of the 15% bracket. She then withdraws enough funds from her taxable account to meet the $81,400 spending goal plus funds to pay taxes on the $47,750 conversion. Strategy 4 allows the portfolio to last 35.51 years, 1.14 years longer than in Strategy 3.

In Strategy 5, the retiree converts two separate $47,750 amounts from the TDA to the TEA at the beginning of Years 1–27. In addition, at the beginning of each year, she withdraws the spending goal of $81,400 plus $4,991.25 (the taxes due on one $47,750 conversion) from the taxable account until it is exhausted. After the taxable account has been exhausted, at the beginning of each year through Year 27, she withdraws $81,400 plus $4,991.25 from the TEA. At the end of each of the first 27 years, she recharacterizes the lower valued of the two converted Roth TEAs. Thus, taxes need to be paid on only one Roth conversion. Beginning in Year 28, the retiree withdraws funds from the TDA to fully use the 10% tax bracket and then withdraws additional funds from the TEA to meet the $81,400 spending goal. This strategy allows the portfolio to last 36.17 years, 0.66 year longer than in Strategy 4.

**Details of Strategy 1.** In Strategy 1, the retiree withdraws $81,400 from the TEA at the beginning of the first three years. In this strategy—as in all the strategies—the remaining TEA balance grows at the asset's pretax rate of return. We set the initial balance such that this account lasts precisely three years. At

 

## Table 2. Longevity Comparisons of Withdrawal Strategies under Progressive Tax Rates

| | Strategy 1 | | | Strategy 2 | | | Strategy 3 | | | Strategy 4 | | | Strategy 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | TEA | TDA | Tax. Acct. | TEA | TDA | Tax. Acct. | TEA | TDA | Tax. Acct. | TEA | TDA | Tax. Acct. | TEA | TDA | Tax. Acct. |
| 0 | $234,928 | $916,505 | $549,601 | $234,928 | $916,505 | $549,601 | $234,928 | $916,505 | $549,601 | $234,928 | $916,505 | $549,601 | $234,928 | $916,505 | $549,601 |
| 1 | 159,669 | 953,165 | 571,585 | 244,325 | 953,165 | 486,929 | 244,325 | 903,505 | 526,289 | 293,985 | 903,505 | 477,106 | 293,985 | 895,579 | 477,106 |
| 2 | 81,400 | 991,292 | 594,449 | 254,098 | 991,292 | 421,750 | 254,098 | 889,986 | 502,277 | 355,405 | 889,986 | 402,436 | 364,286 | 881,742 | 402,436 |
| 3 | 0 | 1,030,944 | 618,227 | 264,262 | 1,030,944 | 353,964 | 264,262 | 875,925 | 477,545 | 419,281 | 875,925 | 325,527 | 428,995 | 867,352 | 325,527 |
| 4 | | 968,939 | 636,031 | 274,833 | 1,072,181 | 283,467 | 274,833 | 861,302 | 452,071 | 485,712 | 861,302 | 246,309 | 495,815 | 844,459 | 246,309 |
| 5 | | 904,454 | 654,349 | 285,826 | 1,115,069 | 210,150 | 285,826 | 846,094 | 425,832 | 554,801 | 846,094 | 164,716 | 574,189 | 828,578 | 164,716 |
| 6 | | 837,389 | 673,194 | 297,259 | 1,159,671 | 133,900 | 297,259 | 830,278 | 398,807 | 626,653 | 830,278 | 80,674 | 647,294 | 812,061 | 80,674 |
| 7 | | 767,642 | 692,582 | 309,149 | 1,206,058 | 54,600 | 309,149 | 813,829 | 370,970 | 695,433 | 813,829 | 0 | 716,900 | 786,957 | 0 |
| 8 | | 695,106 | 712,529 | 321,515 | 1,224,166 | 0 | 321,515 | 796,722 | 342,299 | 683,063 | 796,722 | | 714,271 | 768,775 | |
| 9 | | 619,667 | 733,050 | 334,376 | 1,169,890 | | 334,376 | 778,931 | 312,767 | 670,199 | 778,931 | | 703,132 | 749,866 | |
| 10 | | 541,212 | 754,161 | 347,751 | 1,113,443 | | 347,751 | 760,428 | 282,350 | 656,820 | 760,428 | | 691,070 | 722,274 | |
| 11 | | 459,617 | 775,881 | 361,661 | 1,054,738 | | 361,661 | 741,185 | 251,020 | 642,906 | 741,185 | | 687,408 | 701,505 | |
| 12 | | 374,760 | 798,227 | 376,127 | 993,685 | | 376,127 | 721,173 | 218,750 | 628,435 | 721,173 | | 675,195 | 679,905 | |
| 13 | | 286,507 | 821,216 | 391,173 | 930,190 | | 391,173 | 700,360 | 185,512 | 613,386 | 700,360 | | 662,016 | 649,515 | |
| 14 | | 194,725 | 844,867 | 406,819 | 864,155 | | 406,819 | 678,714 | 151,277 | 597,734 | 678,714 | | 657,191 | 625,835 | |
| 15 | | 99,272 | 869,199 | 423,092 | 795,479 | | 423,092 | 656,203 | 116,015 | 581,457 | 656,203 | | 643,769 | 601,209 | |
| 16 | | 0 | 894,232 | 440,016 | 724,056 | | 440,016 | 632,791 | 79,695 | 564,528 | 632,791 | | 629,333 | 567,671 | |
| 17 | | | 845,345 | 457,617 | 649,775 | | 457,617 | 608,442 | 42,285 | 546,922 | 608,442 | | 623,201 | 540,718 | |
| 18 | | | 794,503 | 475,921 | 572,524 | | 475,921 | 583,120 | 3,753 | 528,612 | 583,120 | | 608,419 | 512,686 | |
| 19 | | | 741,627 | 494,958 | 492,182 | | 458,675 | 556,785 | 0 | 509,570 | 556,785 | | 592,569 | 475,607 | |
| 20 | | | 686,636 | 514,756 | 408,627 | | 436,835 | 529,396 | | 489,766 | 529,396 | | 584,967 | 444,972 | |
| 21 | | | 629,445 | 535,347 | 321,730 | | 414,121 | 500,912 | | 469,169 | 500,912 | | 568,656 | 413,110 | |
| 22 | | | 569,967 | 556,761 | 231,356 | | 390,499 | 471,289 | | 447,749 | 471,289 | | 551,215 | 372,048 | |
| 23 | | | 508,110 | 579,031 | 137,368 | | 365,932 | 440,480 | | 425,472 | 440,480 | | 541,958 | 337,270 | |
| 24 | | | 443,778 | 602,192 | 39,620 | | 340,382 | 408,439 | | 402,304 | 408,439 | | 523,927 | 301,101 | |
| 25 | | | 376,873 | 578,906 | 0 | | 313,811 | 375,117 | | 378,210 | 375,117 | | 504,698 | 255,559 | |
| 26 | | | 307,292 | 517,406 | | | 286,176 | 340,462 | | 353,151 | 340,462 | | 493,580 | 216,121 | |
| 27 | | | 234,928 | 453,447 | | | 257,437 | 304,420 | | 327,090 | 304,420 | | 473,614 | 175,106 | |
| 28 | | | 159,669 | 386,929 | | | 227,547 | 266,937 | | 299,987 | 266,937 | | 428,216 | 160,868 | |
| 29 | | | 81,400 | 317,750 | | | 196,462 | 227,954 | | 271,799 | 227,954 | | 381,003 | 146,061 | |
| 30 | | | 0 | 245,804 | | | 164,134 | 187,412 | | 242,485 | 187,412 | | 331,901 | 130,661 | |
| 31 | | | | 170,980 | | | 130,512 | 145,249 | | 211,997 | 145,249 | | 280,834 | 114,646 | |
| 32 | | | | 93,163 | | | 95,546 | 101,399 | | 180,290 | 101,399 | | 227,726 | 97,989 | |
| 33 | | | | 12,234 | | | 59,181 | 55,795 | | 147,315 | 55,795 | | 172,492 | 80,667 | |
| 34 | | | | | | | 21,361 | 8,367 | | 113,020 | 8,367 | | 115,050 | 62,652 | |
| 35 | | | | | | | | | | 41,586 | 0 | | 55,310 | 43,916 | |
| 36 | | | | | | | | | | | | | 13,946 | 0 | |
| 37 | | | | | | | | | | | | | | | |
| Longevity (years) | | 30 | | | 33.15 | | | 34.37 | | | 35.51 | | | 36.17 | |

*Note:* Year-end balances are rounded to the nearest dollar.

the beginning of Years 4–16, she withdraws $99,271.67 from the TDA, which provides the spending goal of $81,400 after taxes.[6] In this strategy (as in all the strategies), the remaining TDA balance grows at the asset's pretax rate of return. We set the initial TDA balance such that this account lasts precisely 16 years.

For simplicity, Table 2 assumes that the 4% interest on her taxable account is tax-free for the first three years, is taxed at 28% for Years 4–16, and is tax-free after Year 16. In the first three years and from Year 17 on, her AGI consists entirely of this taxable interest, so her taxable income is low—sometimes zero. In Years 4–16, the TDA withdrawal takes her taxable income to within a few dollars of the top of the 25% tax bracket. So, we assume that the 4% interest earned on the taxable account is subject to the 28% tax bracket. Thus, the after-tax return is 2.88%, or (4%)(1 – 0.28). At the beginning of Years 17–30, she withdraws $81,400 from her taxable account. Because she pays taxes each year on the interest, these withdrawals represent principal and are thus tax-free. We set the initial taxable account balance such that this account lasts precisely 30 years.[7]

**Details of Strategy 2.** In this strategy, the retiree withdraws $81,400 from the taxable account at the beginning of Years 1–7, with the remaining funds assumed to grow at the 4% pretax rate of return.[8] Remember that the TDA and TEA grow at the asset's pretax rate of return in all the strategies. In Year 8, she withdraws the remaining $54,599.61 from the taxable account and $28,975.46 from the TDA to meet her $81,400 spending goal. In Years 9–24, she withdraws $99,271.67 from the TDA, which meets her spending goal. In Year 25, she withdraws the remaining funds from the TDA and additional funds from the TEA to meet her spending goal. In Years 26–33, she withdraws $81,400 from the TEA. In Year 34, she withdraws the remaining funds from the TEA, which meets 15% of that year's spending goal. In Strategy 2, her portfolio lasts 33.15 years. This additional 3.15 years, as compared with Strategy 1, is due to withdrawing funds from the (less tax-efficient) taxable account before withdrawing funds from the (more tax-efficient) TDA and TEA.[9]

**Details of Strategy 3.** At the beginning of Years 1–18, the retiree withdraws $47,750 from the TDA to take her taxable income to the top of the 15% tax bracket and $38,641.25 from the taxable account, which provide $81,400 after taxes. In these years, the taxable account grows at the 3% after-tax rate of return, (4%)(1 – 0.25). In Year 19, she withdraws $47,750 from the TDA, the remaining funds from the taxable account, and $34,888.05 from the TEA to meet her spending goal. In Years 20–34, she withdraws $47,750 from the TDA and $38,641.25 from the TEA, which provide $81,400 after taxes. At the beginning of Year 35, she withdraws the remaining funds, which meet her spending needs for 0.37 year. Strategy 3 allows her portfolio to last 34.37 years, which is 1.22 years longer than in Strategy 2.

It is instructive to compare the conventional wisdom strategy (Strategy 2) with Strategy 3. In the conventional wisdom strategy, the retiree has taxable income below the top of the 15% tax bracket in Years 1–8, pays taxes at the 25% rate on $51,521.67 of TDA withdrawals in Years 9–24, and has no AGI in Years 26–33. This approach is *never* the optimal withdrawal strategy. Instead, the retiree should shift some TDA withdrawals from Years 9–24 that are taxed at 25% to (1) Years 1–8 to fill the top of the 15% tax bracket and (2) the later years to fill the 0%, 10%, and 15% tax brackets.

**Details of Strategy 4.** At the beginning of Years 1–7, the retiree converts $47,750 from the TDA to the TEA. In Years 1–6, she withdraws $81,400 plus $4,991.25 (which pays the taxes on the $47,750 TDA withdrawal) from the taxable account to meet her spending needs. In Year 7, she withdraws the remaining taxable account balance and sufficient funds from the TEA to meet her spending target. In Years 8–34, she withdraws $47,750 from the TDA and $38,641.25 from the TEA to meet her spending needs. In Year 35, she withdraws the remaining funds from the TDA and sufficient funds from the TEA to meet her spending needs. At the beginning of Year 36, she withdraws the remaining funds, which meet her needs for 0.51 year. Strategy 4 allows her portfolio to last 35.51 years, or 1.14 years longer than in Strategy 3.

It is instructive to compare Strategies 3 and 4 after the distribution at the beginning of Year 1. Strategy 4 has $47,750 more in the TEA and $47,750 less in the taxable account than does Strategy 3. On a net basis, Strategy 4 shifts funds from Strategy 3's taxable account to Strategy 4's TEA. After the conversion at the beginning of Year 7, Strategy 4 has $377,144 more in the TEA than does Strategy 3.[10] Because the TEA grows tax-free and the taxable account grows at the after-tax rate of return, Strategy 4 allows the portfolio to last longer than in Strategy 3. The size of Strategy 4's relative advantage depends in part on the size of the taxable account, because the taxable account provides the spendable funds until it is exhausted. In this example, the taxable account is exhausted upon the withdrawal in Year 7.

**Details of Strategy 5.** In Strategy 5, we consider the impact of a Roth conversion and recharacterization strategy on the portfolio's longevity. In the modeled version of this strategy, the retiree converts two separate $47,750 amounts from a TDA to a TEA

 

at the beginning of Years 1–27. One $47,750 amount is held in stocks in one Roth IRA; the other Roth IRA contains a one-year bond. At the end of the year, the retiree retains the higher-value Roth IRA and recharacterizes the lower-value one; the recharacterization undoes the Roth conversion, turning it back into a TDA. It is important to hold the stocks and bonds in separate Roth IRAs. If held in the same Roth IRA, the recharacterized funds must be based on the ratio of the market values of the two investments at the time of recharacterization.

This recharacterization option is valuable. Suppose the converted Roth IRA (i.e., the Roth TEA) containing stocks increases from $47,750 at the beginning of the year to $60,000 at year-end. The retiree would retain this Roth TEA and recharacterize the Roth TEA with the bond. This strategy allows the retiree to avoid paying taxes on the $12,250 market gain not only this year but also in future years, because the funds are in a Roth TEA. In contrast, suppose stocks fall in value. In this case, the retiree would recharacterize the Roth TEA containing stocks and retain the Roth TEA containing the bond. This strategy allows the retiree to avoid paying taxes on $47,750—the conversion value of the stocks, which are now worth less than this amount. As we show later in the article, this Roth conversion and recharacterization option allows the portfolio to last longer.

To render these results easier to follow, we make some simplifying assumptions. Except for the converted Roth TEA containing stocks, we assume that the underlying asset is bonds earning 4% pretax interest, as in the previous four strategies. For stocks, we assume that calendar-year stock returns follow a repeating three-year sequence of –12.6%, 22.6%, and 5%, thus producing a 4% geometric return: $(0.874)(1.226)(1.05)^{1/3} - 1 = 4\%$. So, Strategy 5 does not have a return advantage over the other four strategies. The taxable account is subject to a 25% marginal tax rate.

In this strategy, the retiree converts two separate $47,750 amounts from the TDA to the TEA at the beginning of Years 1–27. In addition, at the beginning of each year, she withdraws from the taxable account the spending goal of $81,400 plus $4,991.25 (the taxes due on one $47,750 conversion) until it is exhausted. After the taxable account has been exhausted, she withdraws from the TEA $81,400 plus $4,991.25 at the beginning of each year through Year 27. At the end of Years 1–27, if stock returns are positive, she retains the TEA containing stocks and recharacterizes the TEA containing the bond. If stocks lose value, she retains the TEA containing the bond and recharacterizes the TEA containing stocks.

At the beginning of Year 28, she changes her withdrawal strategy. Because the TDA is now relatively small, at the beginning of each year, she withdraws $20,425 from the TDA, an amount that takes her taxable income to the top of the 10% bracket. In addition, she withdraws $61,867.50—or $81,400 – $19,532.50, where the $19,532.50 is the after-tax amount of the TDA withdrawal—from the TEA to meet her spending goal. At the beginning of Year 36, she withdraws the remaining funds from the TDA plus sufficient funds from the TEA to meet her spending goal. The withdrawal of the remaining funds at the beginning of Year 37 meets 17% of that year's spending needs. Her portfolio lasts 36.17 years, which is 0.66 year longer than in Strategy 4 and more than 3 years longer than in the conventional wisdom strategy (Strategy 2). This example shows that the recharacterization option is a valuable one that can extend the longevity of a portfolio.

The modeled version of this Roth conversion/recharacterization option understates its actual value for three reasons. First, the retiree may convert more than two separate amounts to separate Roth IRAs in early January. For example, she could convert four separate amounts and hold US stocks in one Roth IRA, international developed-market stocks in a second, international emerging-market stocks in a third, and high-grade short-term bonds in a fourth. At the recharacterization date, the retiree would keep the highest-value Roth IRA and recharacterize the rest. Second, at the conversion date in January, the retiree would not know her precise taxable income for that tax year. The recharacterization feature helps overcome this problem. In January, she could convert an amount that would be more than sufficient to fill the top of the 15% tax bracket that year. Some 15.5 months later, in April of the following year (before her tax return is due), she could recharacterize the precise amount needed to take her taxable income to the top of the 15% bracket. Third, the model assumes that the recharacterization option expires after one year; in reality, however, the retiree could delay the due date of her tax return by six months by filing an automatic extension, thus delaying the recharacterization decision until 15 October of the following year. So, the recharacterization option would expire in 21.5 months. For more on the value of this recharacterization option, see Stowe, Fodor, and Stowe (2013).

## Sensitivity Analyses

We conducted sensitivity analyses to examine how robust our conclusions are to changing certain assumptions. We found that the longevity of the portfolio always increases as we move from Strategy 1 to Strategy 5 but the additional longevity between strategies is sensitive to assumptions. Note that the objective of our study was to *illustrate through a spreadsheet* that retirees can extend the longevity of their financial portfolios simply by using the progressive nature of

the tax code and the Roth conversion feature. Seeing is believing, so we want readers to see these results. Consistent with this objective, we assume that the inflation rate is 0% to avoid adjusting the personal exemption amount, the standard deduction amount, and the tops of the tax brackets each year. Because retirees should be more concerned about real (i.e., inflation-adjusted) rates of return, we assume a low 4% return in Table 2 and in most other cases, which is consistent with historical real returns on portfolios recommended for retirees.[11]

In practice, the longevity of a financial portfolio can vary with several factors, including (1) withdrawal strategy, (2) asset allocation, (3) asset returns, (4) asset location, and (5) portfolio size. The objective is to hold everything else constant while changing only the withdrawal strategy. With this objective in mind, we assumed that the underlying asset is bonds earning 4% in Strategies 1–4; bonds and stocks both earn 4% geometric average returns in Strategy 5. In our sensitivity analyses, we changed the asset allocation, the rate of return, and the size of the portfolio. We did not address the asset location decision because that decision may affect the portfolio's risk (Meyer and Reichenstein 2013b) and there is disagreement on how to calculate a portfolio's asset allocation (Reichenstein 2006a). Separately, the additional longevity of Strategy 5 as compared with Strategy 4 depends on the volatility of the risky asset and the sequence of returns.

**Table 3** summarizes the results of our sensitivity analyses. The base case presents the results from Table 2. In the stocks/bonds case, the portfolio is assumed to contain 50% stocks earning a stable 6% annual return and 50% bonds earning a stable 2% return. For the stocks/bonds case, Strategy 1 allows the portfolio to last 30.96 years, which is 0.96 year longer than in the base case. This additional longevity arises because stocks' dividends and capital gains held in the taxable account are taxed at the preferential 15% rate instead of the 25% rate on bonds' interest. The higher after-tax return on the taxable account explains the additional longevities in Strategies 1 and 3 as compared with the base case. Most important, the portfolio longevities increase as we move from Strategy 1 to Strategy 5, and the relative advantages are similar to the relative advantages in the base case.

The 3% return case assumes a 3% return, which may be appropriate given today's low real returns on bonds.[12] Not surprisingly, the lower return shortens all the strategies' longevities, and it also tends to shrink the relative return advantages as we move from Strategy 1 to Strategy 5. However, the strategies' longevities continue to increase as we move from Strategy 1 to Strategy 5.

The lower-wealth case considers a retiree with a lower beginning wealth level at the start of retirement. This retiree has $440,746.94 in a TDA, $123,310.55 in a TEA, and $274,300.65 in a taxable account, and he spends $42,750 each year. As in the base case, the sizes of these accounts are set to become exhausted after Years 3, 16, and 30, respectively, in Strategy 1. When all funds come from the TDA in Years 4–16 in Strategy 1 and in Years 9–24 in Strategy 2, the retiree withdraws $47,739.71, which takes the taxable income to within

**Table 3. Sensitivity Analysis**

| Case | Strategy 1 | Strategy 2 | Strategy 3 | Strategy 4 | Strategy 5 |
|---|---|---|---|---|---|
| Base | 30.00 | 33.15 | 34.37 | 35.51 | 36.17 |
| Relative advantage | | 3.15 | 1.22 | 1.14 | 0.66 |
| Stocks/bonds | 30.96 | 33.15 | 34.87 | 35.72 | 36.13 |
| Relative advantage | | 2.19 | 1.72 | 0.85 | 0.41 |
| 3% return | 25.68 | 27.07 | 28.10 | 28.59 | 29.10 |
| Relative advantage | | 1.39 | 1.03 | 0.49 | 0.51 |
| Lower wealth | 30.00 | 32.73 | 33.56 | 34.05 | 34.53 |
| Relative advantage | | 2.73 | 0.83 | 0.49 | 0.47 |
| Higher volatility | | | | | 36.60 |
| Relative advantage | | | | | 0.43 |
| Sequence of returns | | | | | 36.45 |
| Relative advantage | | | | | 0.28 |

*Notes:* All data are in years. Except for the higher-volatility and sequence-of-returns cases, "relative advantage" denotes the relative advantage in terms of additional longevity as compared with the next-lower strategy (e.g., Strategy 2 compared with Strategy 1). Relative advantage for the higher-volatility case denotes the additional longevity from increasing the volatility of the underlying investment asset in this Strategy 5 as compared with Strategy 5 in the base case. Relative advantage for the sequence-of-returns case denotes the additional longevity from the more favorable sequence of returns in this Strategy 5 as compared with Strategy 5 in the base case.

 

a few dollars of the top of the 15% tax bracket. So, the taxable account earns 3% after taxes in Years 4–16 in Strategy 1. As before, the longevities increase as we move from Strategy 1 to Strategy 5. Strategies 3 and 4 withdraw or convert funds from the TDA to fill the 10% tax bracket. Because the jump from the 10% bracket to the 15% bracket for the lower-wealth retiree is half as large as the jump from the 15% bracket to the 25% bracket for the base case retiree, the increases in longevity from Strategy 2 to Strategy 3 and from Strategy 3 to Strategy 4 are smaller for the lower-wealth retiree than for the base case retiree.

The higher-volatility case repeats the base case except that stock returns follow the repeating sequence of –19%, 6%, and 31%; that is, the volatility of the underlying asset increases from 17.6% in the base case to 25% in the higher-volatility case. This stock still has a 4% geometric average return, but the greater volatility allows Strategy 5 to last 0.43 year longer than in the base case.[13]

The sequence-of-returns case repeats the base case except that stock returns follow the repeating sequence of 22.6%, 5%, and –12.6% (instead of –12.6%, 22.6%, and 5%). When there are cash withdrawals, the sequence of returns matters. This more favorable sequence of returns allows the portfolio to last 36.45 years, 0.28 year longer than in the base case.

In summary, Table 3 presents the results of our sensitivity analyses of portfolio longevity with respect to changes in asset allocation, rate of return, or level of wealth for a retiree while holding other factors constant. In each case, the longevities of the financial portfolio always increase as we move from Strategy 1 to Strategy 5. Moreover, the relative sizes of the additional longevities as we move from Strategy 1 to Strategy 5 are consistent with expectations. Separately, Table 3 shows that the additional longevity of Strategy 5 as compared with Strategy 4 increases with the volatility of the underlying asset and when the sequence of returns is more favorable. These outcomes are also consistent with expectations. These results imply that other retirees should find that the longevity of their portfolios will increase as they move from Strategy 1 to Strategy 5. In short, the lessons from the detailed example in Table 2 appear to hold for other retirees.

## Large Tax-Deductible Expenses

A second circumstance that places many retirees in an unusually low tax bracket is when they have large tax-deductible expenses, which often take the form of medical costs. Although medical costs are likely the most common large expenses that retirees will incur, other tax-deductible expenses, such as casualty and theft losses and charitable contributions, also provide retirees with opportunities to shield retirement income from taxation. In addition, many people of retirement age, including some who call themselves retired, work at least part-time. The loss of a job or cessation of work could also cause a retiree to be in an unusually low tax bracket.

High-medical-expense years often occur near the end of life. From a tax-planning perspective, it is useful to save some TDA balances to accommodate the nontrivial possibility that a retiree will incur high medical expenses later in life. If a retiree incurs such expenses, some TDA balances should be saved to pay for them. Under the partnership perspective, the government takes $t$ of each dollar withdrawn from the TDA. Because the retiree's tax rate will generally be unusually low in high-medical-expense years, some TDA balances should be set aside for such expenses.

Using the base case results from Table 2, we assume that the retiree becomes impaired at age 91 (i.e., at the beginning of Year 27), spends her last three years in an assisted living facility or nursing home, and dies at age 94 (i.e., at the end of Year 29). As before, she spends $81,400 a year after taxes in her last three years (Years 27–29). Her son, who is in a 25% tax bracket, inherits her remaining assets. **Table 4** presents end-of-year balances for Strategies 1–5.

In Strategy 1, the retiree dies at age 94, and her beneficiary inherits $81,400 held in a taxable account. Because the cost basis is also $81,400, this is the after-tax amount inherited by her son. In Strategy 2, she dies at age 94, and her son inherits $317,750 of TEA assets tax-free. In Strategy 3, she withdraws $81,400 from the TDA in Years 27–29 to pay expenses, but she does not withdraw any funds from the TEA for these years. Although these pretax withdrawals from the TDA increase her taxable income, they are probably tax-free owing to deductible medical expenses.[14] At her death, her son inherits $321,910 of TEA assets plus $118,711 of TDA assets. Because her son is in the 25% tax bracket, Strategy 3 provides him with $410,943 after taxes: $321,910 + ($118,711)(1 – 0.25). In Strategy 4, she withdraws $81,400 from the TDA in Years 27–29 and nothing from the TEA. As before, her taxes would be trivial at most. Because her son is in the 25% tax bracket, Strategy 4 provides him with $486,280 after taxes. In Strategy 5, she withdraws $81,400 from the TDA in Years 27 and 28. In Year 29, she withdraws the remaining funds from the TDA and additional funds from the TEA to meet her spending needs. To keep the assumed returns the same as in Strategies 1–4, we assume that funds earn 4% pretax each year during these last three years. Strategy 5 provides her son with $534,055 after taxes. This amount is approximately $216,000 more than would be available in the conventional wisdom strategy (Strategy 2) and approximately $48,000 more than would be available in Strategy 4.

**Table 4. Withdrawal Strategies under Progressive Tax Rates and High Medical Expenses**

| | Strategy 1 | | | Strategy 2 | | | Strategy 3 | | | Strategy 4 | | | Strategy 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | TEA | TDA | Tax. Acct. | TEA | TDA | Tax. Acct. | TEA | TDA | Tax. Acct. | TEA | TDA | Tax. Acct. | TEA | TDA | Tax. Acct. |
| 26 | | | $307,292 | $517,406 | | | $286,176 | $340,462 | | $353,151 | $340,462 | | $493,580 | $216,121 | |
| 27 | | | 234,928 | 453,447 | | | 279,623 | 269,424 | | 367,277 | 269,424 | | 513,323 | 140,110 | |
| 28 | | | 159,669 | 386,929 | | | 309,528 | 195,545 | | 381,968 | 195,545 | | 533,856 | 61,058 | |
| 29 | | | 81,400 | 317,750 | | | 321,910 | 118,711 | | 397,247 | 118,711 | | 534,055 | 0 | |

*Notes:* The taxpayer has $81,400 of medical expenses from age 91 until her death at age 94, the end of Year 29. In Strategies 3 and 4, she withdraws $81,400 from her TDA in her last three years and, owing to her deductible medical expenses, pays no taxes in these three years. In Strategy 5, she withdraws $81,400 from her TDA in Years 27 and 28. In Year 29, she withdraws the remaining TDA balances plus $20,341.82 from her TEA to meet her spending needs. Year-end balances are rounded to the nearest dollar.

This example demonstrates that because many retirees incur high medical expenses late in life, it is wise to retain some funds in TDAs to accommodate this likelihood. Under the partnership principle, the government effectively owns *t* of the TDA's principal. Owing to high medical expenses, the effective tax rate on these TDA withdrawals would probably be zero. Thus, this example is an application of the second principle: withdraw funds from the TDA whenever those funds would be taxed at an unusually low rate.

## Conclusion

Conventional wisdom suggests that a retiree should withdraw funds from taxable accounts until they are exhausted; then from tax-deferred accounts, such as a 401(k), until they are exhausted; and finally from tax-exempt accounts, such as a Roth 401(k). We have demonstrated that the conventional wisdom is wrong.

Properly viewed, a tax-deferred account is like a partnership in which the investor effectively owns (1 – *t*) of the partnership's current principal, where *t* is the marginal tax rate when the funds are withdrawn in retirement. The government effectively owns the remaining *t* of the partnership. When viewed from this perspective, the after-tax value of the investor's portion of funds in the TDA grows tax exempt. Thus, assuming a flat tax rate, a retiree's portfolio would last precisely the same length of time if the order of withdrawals was taxable account, then TDA, then TEA—or taxable account, then TEA, then TDA.

The partnership principle is useful in devising tax-efficient withdrawal strategies under progressive tax rates. In particular, one tax-efficient withdrawal strategy is to time withdrawals from TDAs for years when those funds would be subject to an unusually low marginal tax rate for that investor. For example, if a taxpayer is usually subject to a 25% marginal rate once required minimum distributions begin, she could withdraw funds each year from her TDA so long as those funds are subject to a marginal tax rate of 15% or lower and then withdraw additional funds from the taxable account. After the taxable account has been exhausted and the TDA and TEA remain, she could withdraw some funds from the TDA each year. At a minimum, this amount should be the tax-free amount that would be offset by the sum of her personal exemption and either her standard deduction or her itemized deductions. The optimal withdrawal may also be a higher amount, such as withdrawals that would take the retiree to the top of the 10% or 15% tax bracket. Additional amounts could be withdrawn from the TEA each year. The objective is to minimize the average of marginal tax rates on the TDA withdrawals.

We also presented two tax-efficient withdrawal strategies that use Roth conversions. In the first of these strategies, the taxpayer converts sufficient funds from the TDA to a Roth IRA to fully use the 15% tax bracket; he would be in the 25% bracket if all withdrawals came from the TDA. Then, he withdraws additional funds from the taxable account as needed to meet his spending goal. Once the taxable account has been exhausted, he withdraws sufficient funds each year from the TDA to fully use the 15% bracket and then withdraws additional funds from the TEA. The advantage of this strategy as compared with the previous strategy is that the taxpayer has more funds in the TEA growing tax-free but fewer funds in the taxable account growing at an after-tax rate of return.

In the second tax-efficient withdrawal strategy that uses Roth conversions, the taxpayer makes two separate Roth conversions at the beginning of the first 27 retirement years, with each conversion amount sufficient to fully use the 15% tax bracket. At the end of the year, she retains the funds in the Roth TEA with the higher returns and recharacterizes the other Roth TEA back to the TDA. This strategy allows her to avoid taxes on the returns earned on the converted funds, which will grow tax-free in the TEA.

In a detailed example using the 2013 US tax brackets, we demonstrated that the most tax-efficient withdrawal strategy can add more than six years to a portfolio's longevity as compared with a tax-inefficient strategy. In addition, the most tax-efficient withdrawal strategy added more than three years as compared with the conventional wisdom strategy, which is often recommended as a tax-efficient withdrawal strategy.

Finally, we showed the advantage of holding some funds in a TDA to accommodate the possibility of large tax-deductible expenses, such as medical costs, which often occur late in life. Although these TDA withdrawals are subject to taxes, the retiree would probably be in the 0% tax bracket owing to high medical expenses.

*This article qualifies for 1 CE credit.*

## Notes

1. For example, the Canada Revenue Agency offers a TDA called a Registered Retirement Savings Plan (www.cra-arc.gc.ca/tx/ndvdls/tpcs/rrsp-reer/rrsps-eng.html) and a TEA called a Tax-Free Savings Account (www.cra-arc.gc.ca/tx/ndvdls/tpcs/tfsa-celi/menu-eng.html).
2. Because the combined assets under management (AUM) of the three largest fund families exceeds the combined AUM of fund families ranked 6 to 100, the conventional wisdom represents the advice that millions of investors receive from the profession (see InvestmentNews 2014).

3. The capital gains can be tax-free if the taxpayer (1) is in the 10% or 15% tax bracket, (2) awaits the step-up in basis at death, or (3) donates the appreciated asset to a qualified charity. Nevertheless, in general, the individual investor receives only part of the return on stocks held in taxable accounts.
4. We set the retirement period at 30 years to correspond with the 30-year retirement period usually considered in the withdrawal rate literature.
5. A retiree who expects Congress to raise tax rates may wish to modify her acceptable "low tax rate" to reflect that expectation. For example, if she is confident that today's tax laws will remain the same, she may be willing to withdraw or convert funds from a TDA today so long as her marginal tax rate is 25% or less. Owing to expected tax hikes, however, she may increase her acceptable "low tax rate" to 28%.
6. The $99,271.67 consists of $11,500, $8,925, $27,325, and $51,521.67, which are taxed at 0%, 10%, 15%, and 25%, respectively. The after-tax amounts total $81,400.
7. In a more detailed spreadsheet, we calculated her taxes on bonds held in the taxable account for Years 1–3 and 17–30. In addition, we calculated her after-tax returns on this account for Years 4–16. This more precise calculation reduced her portfolio's longevity to 29.66 years. Thus, our simplifying assumptions understate the additional longevity that is possible under a tax-efficient withdrawal strategy.
8. In Years 1–3, she owes $722.80, $469.23, and $206.52 in taxes on interest earned on the taxable account. Given these details, her portfolio provides funds for 33.09 years, a little less than suggested in Table 2.
9. In this example, the retiree does not meet her RMD in Years 6–8. If we assume that she retires at 62, however, there is no violation of the RMD rules. But if she retires at 62, her standard deduction is $1,500 less before age 65 (owing to the loss of the additional standard deduction for age). This change causes the tax-free withdrawal amount and the withdrawal amount to the top of the 15% tax bracket to differ on each side of age 65. To keep the example sufficiently simple for readers to follow, we avoid this complexity and assume that she retires at 65. This assumption does not materially affect the longevity of Strategy 2 as compared with the longevities of the other strategies.
10. After the conversion at the beginning of Year 7, the TEA has $674,403 in Strategy 4 (an ending balance in Year 6 of $626,653 + $47,750) but only $297,259 in Strategy 3.
11. Target retirement date funds provide target asset allocations for investors by year of retirement. Fidelity and Vanguard are the two largest mutual fund families. The 2015 Fidelity Freedom Fund and the 2015 Vanguard Target Retirement Fund currently recommend, respectively, stock allocations of 56% and 52% for typical individuals retiring in 2015, and Fidelity's and Vanguard's income funds, which are intended for individuals who are at least 14 and 7 years past retirement, recommend 24% and 30% stock allocations. Large-cap stocks and five-year Treasuries have produced 6.8% and 2.4% real returns over 1926–2013 (Ibbotson Associates 2014). But these returns ignore the costs of running mutual funds, including the funds' expense ratios and transaction costs. Assuming total annual costs of 0%, 0.25%, and 0.5%, these historical returns are consistent with a 4% real return and stock asset allocations of 36%, 42%, and 48%. Thus, the 4% nominal return with 0% inflation rate is consistent with historical real returns on stock/bond portfolios with asset allocations recommended for typical retirees.
12. As of 30 June 2014, the real return on five-year Treasury Inflation-Protected Securities (TIPS) was 0.6%. Assuming that the geometric average equity risk premium is near its historic 4.8% level, the real return on a 50%/50% stock/bond portfolio would be about 3%. See Ibbotson Associates (2014).
13. At the beginning of Years 1–24, the retiree converts two separate TDAs worth $47,750 to a Roth TEA and recharacterizes the lower-value TEA at the end of the year. In Years 25–26, he withdraws $47,750 from the TDA to take his taxable income to the top of the 15% bracket plus additional funds from the TEA to meet his spending goal. Thereafter, because his TDA balance is relatively low, he withdraws $20,425 from the TDA to take his taxable income to the top of the 10% bracket and also withdraws the remaining funds from the TEA.
14. Her AGI and medical expenses would be $81,400. Medical expenses exceeding 10% of AGI would be tax deductible. The $8,140 of AGI after the deduction of medical expenses would likely be less than her personal exemption and other itemized expenses (state income or sales taxes, real estate taxes, mortgage interest, charitable contributions, etc.). So, her taxes would likely be zero or trivial.

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