**Investing in Stocks inside Retirement Accounts and Bonds in Taxable Accounts**

**Abstract:** It is widely held that investing in bonds inside retirement accounts and stocks inside taxable accounts is tax efficient. This view leads to the rule of thumb, “Hold ordinary income-producing investments inside retirement accounts.” This rule does not stand up to scrutiny. If the economic environment is one of low expected inflation, low expected bond returns, and expected stock returns about double (or more) than bond returns, this article shows that investing in stocks with contributions to retirement accounts and buying investment-grade bonds in taxable accounts are wealth maximizing.

by

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Personal finance writers such as Jonathan Clements (2016) recommend having “tax-efficient investments in your taxable account, while using your retirement accounts to hold investments that generate big annual tax bills.” How to properly apply this advice is a challenge. Generally, the advice on where to hold stocks and bonds assumes the tax law is the only relevant factor for where a high-income individual’s investments should be held and a typical suggestion is the following: hold taxable bonds in retirement accounts while holding stock index funds in the taxable account.[[1]](#endnote-1)

However, Anderson and Murphy (2014) point out that tax rates are one of three factors that matter: “The best (location) depends on factors such as rates of return, tax rates, and the investment horizon.” Because of their tax-favored treatment, any retirement account results in an investment having a higher after-tax rate of return than the same investment’s after-tax rate of return if it is held in a taxable (i.e., personal or nonqualified) account.[[2]](#endnote-2) Given this fact, from a tax efficiency viewpoint, to maximize wealth all investments should be held inside retirement accounts. However, many individual investors invest some funds inside retirement accounts and some funds in taxable accounts each year. The latter investments are generally made either for liquidity reasons or because the individual invests more for the year than is allowed inside all of his or her retirement account opportunities. This article ignores the former reason for investing in taxable accounts and focuses on the latter.

Prior Research

Prior research has come to conflicting conclusions about whether to hold stocks or bonds inside taxable accounts versus retirement accounts. Dammon, Spatt, and Zhang (2004) conclude that there is a “strong preference for holding taxable bonds in the tax-deferred [401(k); traditional IRA] account and equity in the taxable account.” The analysis by Horan and Al Zaman (2008) concludes that equity generally should “be located in the taxable account because it is relatively tax efficient.” In three papers that Reichenstein either sole-authored or coauthored, the conclusions include the following: “The optimal asset location is to… hold stocks in taxable accounts” from Reichenstein (2007a); “Except in extreme cases, individuals should locate bonds in retirement accounts and stocks in taxable accounts” from Reichenstein (2007b); and “Except in rare cases, investors should hold stocks in taxable accounts and bonds in retirement accounts” from Reichenstein and Meyer (2013). This conclusion to hold bonds in retirement accounts and stocks in taxable accounts will be called the traditional view.

An article put out by mutual fund giant Vanguard (2015) was consistent with this view. To summarize the article, more than 70% of the approximately 1.1 million Vanguard investors with both IRAs and taxable accounts have located their investments tax efficiently. The article states that “if you don’t own bonds…in taxable accounts,” “your assets are well-located.” In contrast, 29% “have bonds and/or active[ly managed stock] mutual funds in taxable accounts, and index [stock mutual] funds and/or individual stocks in IRAs.” The article stated that such investors “have opportunities for better asset location [and] may be paying more in taxes than they need to.” The present article calls into question Vanguard’s claim that it is not tax efficient to own bonds in taxable accounts while owning a mutual fund invested in a passive stock index inside an IRA.

The conclusions from other articles are not expressed with such certainty. For instance, the analysis in Anderson and Murphy (2014) is broadly consistent with the tax-efficient asset location being non-dividend-paying stocks in retirement accounts and bonds in taxable accounts, given a 12-year investment horizon and the following expected returns and tax rates:

* the expected return on such stocks is approximately *double* (or more) the expected return on bonds when the ordinary tax rate (t) = 33% and long-term capital gains tax rate (g) = 15%;
* the expected return on such stocks is approximately *80% higher* (or more) than the expected return on bonds when t = 28% and g = 15%;
* the expected return on such stocks is approximately *two-thirds higher* (or more) than the expected return on bonds when t = 25% and g = 15%.

Shynkevich (2010) does a historical analysis of stock and bond returns and finds that in

the middle part of the last century, times characterized by low inflation, low bond returns, and dividend yields exceeding the returns on 10-year Treasury bonds, tax sheltering (i.e., placing inside retirement accounts) stocks outperformed tax sheltering bonds. One of the conclusions by Daryanani and Cordaro (2005) is that “low-return [investments] can be placed in either [an IRA or a taxable] account, since the difference in end-wealth will be small.”

The current economic environment (early in 2017) is an expectation of low (but increasing) expected inflation, low expected bond returns, and, given the historical annual return on stocks, expected stock returns of double or more that of bond returns.[[3]](#endnote-3) If the bond returns turn out to be low and the return on stocks turns out to be near historical averages, then stock inside retirement accounts and bonds in taxable accounts is the wealth-maximizing strategy. This is in contrast to the traditional view.

This article focuses on providing break-even lines for financial planning practitioners to decide whether it is tax efficient (i.e., wealth maximizing) to place stocks or bonds inside retirement accounts while placing the other in taxable accounts.[[4]](#endnote-4) Figure 1 shows the formulas used in this paper. They all assume that any after-tax earnings are reinvested in the same investment.

**Figure 1: Relevant Formulas[[5]](#endnote-5)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Investment Model / Examples** | | | **Rate of**  **Taxation** | | **Frequency**  **Of Taxation** | | **Is Initial**  **Investment**  **Deductible?** | **Future Value of Investment After Taxes (ATFV)** | |
| 1) Taxed annually at ordinary rate /  e.g., certificate of deposit, taxable bond | | | Ordinary | | Annual | | No | = AT$ [1 + R (1 – t)]n | |
| 2) Taxed annually and rate is favorable because of qualified dividends and/or capital gain distributions /  e.g., actively managed mutual fund of stocks  3) Tax deferred until sale and rate is favorable since long-term capital gain / e.g., stock that pays no dividends | | | Favorable Favorable | | Annual  Deferred | | No  No | = AT$ [1 + R (1 – g)]n  = AT$ [(1 + R )n (1 – gn) + gn] | |
| 4) Tax savings at contribution and tax deferred until payout / e.g., 401(k), 403(b), deductible IRA | | | Ordinary | | Deferred | | Yes | = AT$ (1 + R )n (1 – tn )  ( 1 – t0 ) | |
| 5) Tax free / e.g., Roth IRA, Roth 401(k) | | | None | | Never | | No | = AT$ [1 + R ]n | |
|  |  |  | |  | |  | | |

where:

ATFV = After-tax future value

AT$ = After-tax dollars invested

R = Before-tax rate of return

n = Investment horizon (in years) (i.e., holding period)

t = Marginal ordinary tax rate annually

t0 = Marginal ordinary tax rate today (year 0)

tn = Marginal ordinary tax rate at end of investment horizon (year n).

g = Marginal favorable tax rate annually

gn = Marginal favorable tax rate at end of investment horizon (year n).

Comparing the Roth retirement account (model 5) and the tax-deferred retirement account (model 4), these two formulas are equal when t0 = tn and the after-tax amount put into both is the same. For now, it is assumed that this is the case. Later in the article, this assumption that makes these two retirement accounts equal will be changed.

**What Rates of Return Should Be Used in Comparisons?**

Ibbotson (Morningstar, 2015) lists the returns on large-cap stocks, long-term corporate bonds, and long-term (federal) government bonds. The 2015 *Yearbook* shows that for the period from January 1, 1926 through December 31, 2014, the geometric means of the annualized returns were 10.1%, 6.1%, and 5.7%, respectively.[[6]](#endnote-6) Ibbotson also lists inflation, and for the same period the geometric mean of the annualized rate is 2.9%. Given that inflation has averaged only 1.5% in recent years (i.e., from the beginning of 2012 to the end of 2014) according to the *Yearbook*, it is appropriate to reduce the annualized returns on the stocks and bonds from their historical averages—which includes inflation. In the comparisons that follow 8% is used as the expected return on stocks and 4% is used as the expected return on “taxable” bonds.

**Assumptions and Comparisons**

It is assumed that it is the start of the year and an employee who has reached age 50 will invest $50,000 of the employee’s pretax salary. For simplicity, $25,000 is assumed to be the maximum pretax amount that can be contributed to the employee’s 401(k).[[7]](#endnote-7) The remaining after-tax salary must be invested outside the 401(k). For simplicity, it is also assumed that the investments will be made on the first day of the year. Given the tax law, which location to hold each asset is important, but it is not the only important criterion to determine the proper place to hold an investment. Another important piece of information is the expected return on the investment. For example, the employee could invest $25,000 of pretax salary in a qualified tax-deferred account (TDA) like a 401(k) and $25,000 of pretax salary outside a qualified retirement account (i.e., outside in a taxable account) this year. In this example, the employee chooses to invest $25,000 in taxable bonds with a return of 4.0% inside a TDA and $18,750 (after-tax salary assuming a 25% tax rate) in a mutual fund of stocks (i.e., a hybrid of models 2 and 3) with a return of 8% of which one-quarter (i.e., 2%) is annual dividends and three-quarters (i.e., 6%) is annual appreciation.[[8]](#endnote-8) The approach focusing only on the tax law would say to hold the lower-yielding taxable bonds in the retirement account because they yield ordinary income that gets taxed at the higher ordinary rates and to hold the stocks outside in a taxable account because they are taxed favorably. The after-tax future values (ATFVs) in the scenarios (i.e., comparisons) that follow show this is the wrong conclusion. In scenario 1 which follows, the individual is assumed to have a marginal ordinary tax rate (t) that is always 25% on interest and a marginal tax rate on dividends and long-term capital gains (g) that is always 15%.[[9]](#endnote-9) The investment horizon is assumed to be 20 years. Later in the article, this assumption about the length of the investment horizon will be changed.

**Scenario 1: n = 20; RS = 8%; RbB = 4%; t = 25%; g = 15%**

**Stocks In – Bonds Out:**

| **Stocks in TDA (model 4)** | **$25,000(1.08)20(1 − .25)** | **$87,393** |
| --- | --- | --- |
| **Bonds in taxable account (model 1)** | **$18,750 (1 +.04(1− .25))20** | **33,865** |
| **ATFV** |  | **$121,258** |

**Bonds In – Stocks Out:**[[10]](#endnote-10)

| **Bonds in TDA (model 4)** | | **$25,000(1.04)20(1 − .25)** | **$41,084** |
| --- | --- | --- | --- |
| **Stocks in taxable account (hybrid: models 2 & 3)[[11]](#endnote-11)** | **$18,750(1.08 − .003)20 − .15{$18,750(1.08 − .003)20**  **− 18,750[(.75 + (1.08 − .003)20 .25(1 − 0.15)) / 1 − (.25 × .15)]}** | | **75,193** |
| **ATFV** | |  | **$116,277** |

Scenario 1 shows the individual will be wealthier (i.e., have a higher ATFV) by 4.3% [($121,258 − $116,277) / $116,277] if the stock is held inside the TDA and the bond is held outside in a taxable account.[[12]](#endnote-12) The intuition behind the conclusion from this scenario is there is a limited amount of money that can be put into retirement accounts, so an investor should take the greatest tax advantage possible with such accounts. The mutual fund of stocks whose return consists partly of qualified dividends and partly of long-term capital gain when it is sold in 20 years is subject to a small amount of tax annually and a significant amount when sold, so having this high-return (R = 8%) investment inside the retirement account avoids a lot of tax.[[13]](#endnote-13)

**Further Analysis: Tax Rate Changing After n Years**

The next scenario uses the same facts but relaxes the assumption that t = tn. The assumption that t = 25% remains but now, in scenario 2, tn = 15%. This is consistent with the individual being retired from work and the resulting drop in income reducing that individual’s tax bracket. Since tn is below 25%, consistent with current tax law it is also assumed that gn = 0%, instead of 15%.[[14]](#endnote-14) Returning to scenario 1’s facts, but with the new percentages for tn and gn, the results for scenario 2 are the following:

**Scenario 2: n = 20; RS = 8%; RB = 4%; t = 25%; g = 15%; tn = 15%; gn = 0%**

**Stocks In – Bonds Out:**

| **Stocks in TDA (model 4)** | **$25,000(1.08)20(1 − .15)** | **$99,045** |
| --- | --- | --- |
| **Bonds in taxable account (model 1)** | **$18,750 (1 + .04(1 − .25))20** | **33,865** |
|  |  |  |
| **ATFV** |  | **$132,910** |

**Bonds In – Stocks Out:**

| **Bonds in TDA (model 4)** | **$25,000(1.04)20(1 − .15)** | **$46,561** |
| --- | --- | --- |
| **Stocks in taxable account (hybrid: models 2 & 3)[[15]](#endnote-15)** | **$18,750(1.08 − .003)20** | **82,664** |
| **ATFV** |  | **$129,225** |

In scenario 2, the ATFVs for Stocks In – Bonds Out versus Bonds In – Stocks Out are not spread as widely apart as in scenario 1. Specifically, the individual will be wealthier by 2.9% [($132,910 − $129,225) / $129,225] if the stocks are held inside the TDA and the bonds are held outside in a taxable account. Compared with scenario 1, the bonds held in the taxable account have the same ATFV, but all of the other ATFVs increase due to the lower tax rate at year n. Stocks In – Bonds Out is not as strong of a winner in scenario 2 compared with scenario 1 despite the biggest increase in ATFV being the stock held in the retirement account where the decrease in the tax rate from 25% to 15% increases the after-tax value of the retirement account a lot. This is tempered slightly by the fact that in Bonds In – Stocks Out, the bonds held in the retirement account are taxed at only 15% instead of 25%. Further, this is tempered significantly by the fact that the stocks’ appreciation when held in the taxable account is taxed at 0% instead of 15%.

**Summary of Scenarios**

In both scenarios thus far, n = 20 years, t0 = 25%, and g0 = 15%. The other variables and results of both scenarios are listed in the following table:

**Table 1**

|  |  |  |
| --- | --- | --- |
|  | **Scenario 1** | **Scenario 2** |
| tn | 25% | 15% |
| gn | 15% | 0% |
| [1] ATFV: Stocks In – Bonds Out | $121,258 | $132,910 |
| [2] ATFV: Bonds In – Stocks Out | $116,277 | $129,225 |
| [1] – [2] = [3] Difference | $4,981 | $3,685 |
| [3] / [2] Percentage increase | 4.3% | 2.9% |

Assume that instead of 8%, RS is higher and/or that instead of 4%, RB is lower. For scenarios 1 and 2, Stocks In – Bonds Out instead of Bonds In – Stocks Out will increase wealth by a larger percentage than in Table 1.

**Sensitivity Analysis—Change n = 20 Years to 10 Years or 30 Years**

In this example, it continues to be assumed that RS = 8% and RB = 4%. As stated earlier, Anderson and Murphy point out that “the best (location of stocks and bonds) depends on…rate of return, tax rates (throughout the life of the investment), and the investment horizon.” The analysis thus far has varied the first two variables but not the last variable, which is investment horizon. It is possible that the preference of Stocks In – Bonds Out could change to Bonds In – Stocks Out when the number of years that an investment benefits from tax deferred growth changes. Reviewing the investment models, the hybrid of models 2 and 3 (i.e., mutual fund of appreciating, dividend-paying stocks) and model 4, the TDA, benefit from tax-deferred growth. In contrast, model 1 (i.e., taxable bonds held in a taxable account) does not benefit from tax-deferred growth. In Table 2, scenarios 1 and 2 are rerun assuming n = 30 years (the first two columns) and n = 10 years (the last two columns):

**Table 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Scenario 1 with n = 30** | **Scenario 2 with n = 30** | **Scenario 1 with n = 10** | **Scenario 2 with n = 10** |
| tn | 25% | 15% | 25% | 15% |
| gn | 15% | 0% | 15% | 0% |
| [1] ATFV: Stocks In – Bonds Out | $234,186 | $259,343 | $65,678 | $71,076 |
| [2] ATFV: Bonds In – Stocks Out | $216,287 | $242,491 | $64,714 | $70,825 |
| [1] – [2] = [3] Difference | $17,899 | $16,852 | $964 | $251 |
| [3] / [2] Percentage increase | 8.3% | 6.9% | 1.5% | 0.4% |

In Table 2, the percentage by which Stocks In – Bonds Out wins when n is only 10 years is much slimmer than in Table 1 when n = 20 years. This decline occurs primarily because relatively high-return stocks (i.e., R = 8%) inside retirement accounts for only 10 years do not gain nearly as much benefit from tax-deferred growth as the same stocks inside retirement accounts for a longer period of time. Consistent with this, if n increases to 30 years, then the percentage by which Stocks In – Bonds Out wins is a lot larger than it was in Table 1 when n was only 20 years.

**Further Analysis: Retirement Account Is a Roth**

Some individuals find it more beneficial to contribute to a tax-exempt account (TEA) (e.g., Roth 401(k)) than a TDA. As proof, reviewing the formulas for TDA (model 4 in Figure 1) and TEA (model 5 in Figure 1), if t0 < tn, the after-tax future value is greater for a TEA than for a TDA. The tax law effectively allows a higher after-tax amount to be put into a Roth retirement account than the corresponding TDA. The former allows a maximum of AT$, whereas the latter allows a maximum of AT$ / ( 1 – t0 ). Given the assumptions that $25,000 is the maximum allowed to be contributed to the TDA or to the TEA and that t0 = 25%, $18,750 is the maximum AT$ allowed into the TDA (since $18,750 / ( 1 – .25) = $25,000) and $25,000 is the maximum AT$ allowed into the TEA. Since the Roth 401(k) receives after-tax dollars instead of pretax dollars, the $50,000 of pretax salary is taxed at 25%, and then the $37,500 of after-tax dollars remaining is invested: $25,000 into the tax-exempt account (TEA) which is the Roth 401(k) and $12,500 outside a qualified retirement account (i.e., out in a taxable account) this year. Even with t0 = tn, an individual could be even wealthier (i.e., have a higher total ATFV) if the individual invests $25,000 of after-tax salary into a Roth 401(k) and the remaining $12,500 of after-tax salary outside the retirement account than in the scenarios shown in Table 1. For example, reviewing Stocks In – Bonds Out in Table 1 for scenario 1, the total after-tax future value is $121,258. However, if $25,000 of after-tax salary is invested in the Roth 401(k), $18,750 of which is in holding the stocks and $6,250 of which is invested in bonds, and the remaining $12,500 is invested in bonds held outside in taxable accounts, then the individual ends up with $123,664 as shown in scenario 3 that follows, $2,406 more than in scenario 1. Of course, a similar result occurs for Bonds In – Stocks Out as the individual ends up with $120,344, as shown in scenario 3 that follows, $4,067 more than in scenario 1:[[16]](#endnote-16)

**Scenario 3: Roth Retirement Account;**

**n = 20; RS = 8%; RB = 4%; t = 25%; g = 15%**

**Stocks In – Bonds Out: Using a Roth 401(k) to hold AT$ = $25,000:**

| **Stocks in Roth 401(k) (model 5)** | **$18,750(1.08)20** | **$87,393** |
| --- | --- | --- |
| **Bonds in Roth 401(k) (model 5)** | **$ 6,250(1.04)20** | **13,695** |
| **Bonds in taxable account (model 1)** | **$12,500 (1 + .04(1 − .25))20** | **22,576** |
| **ATFV** |  | **$123,664** |

**Bonds In – Stocks Out: Using a Roth 401(k) to hold AT$ = $25,000:**

| **Bonds held in Roth (model 5)** | | **$18,750(1.04)20** | **$41,084** |
| --- | --- | --- | --- |
| **Stocks held in Roth (model 5)** | | **$ 6,250(1.08)20** | **29,131** |
| **Stocks in taxable account (hybrid: models 2 & 3)** | **$12,500(1.08 − .003)20 − .15{$12,500(1.08 − .003)20**  **− 12,500[(.75 + (1.08 − .003)20 .25(1 − .15)) / 1 − (.25 × .15)]}** | | **50,129** |
| **ATFV** | |  | **$120,344** |

|  |  |  |
| --- | --- | --- |
|  |  |  |

Scenario 3 shows the individual will be wealthier (i.e., have a higher ATFV) by 2.8 percent [($123,664 − $120,344) / $120,344] if mostly stocks are held inside the TEA and most of the bonds are held outside in a taxable account. As discussed in the last paragraph, effectively, more after-tax dollars can be contributed to a Roth 401(k) than to a traditional 401(k) because the former allows after-tax contributions whereas the latter only allows *before*-tax contributions (i.e., AT$ / ( 1 – t0 )). The reason that ATFV of Stocks In – Bonds Out ($123,664) is slightly higher than Table 1, scenario 1’s Stocks In – Bonds Out ($121,258) is because of the $6,250 of bonds earning 4% inside the Roth not being subject to tax instead of being in the taxable account. The ATFV of Bonds In – Stocks Out ($120,344) in scenario 3 is also higher than the ATFV of Bonds In – Stocks Out in Table 1, scenario 1 ($116,277). This is because the $6,250 of stock earning 8% held inside the Roth 401(k) benefits a lot by not being subject to tax when distributed in 20 years.

To summarize these first three scenarios, the asset that should be put into the retirement account is the one that gets the biggest advantage from being inside such account, relative to the other asset being outside such account. It turns out that the rule of thumb to always put the investment producing ordinary income into the retirement account is not always tax efficient, as scenarios 1 through 3 illustrate. Instead, the analysis thus far in this article is consistent with the situation in which an individual contributes the maximum to his or her 401(k) retirement account each year and invests in stocks inside the retirement account and bonds, other than high-yield (i.e., junk) bonds, in his or her taxable account, maximizing his or her after-tax wealth given the relatively low rate of return (4%) on investment-grade taxable bonds relative to the return on stocks (8%) assumed thus far.

**Repeating the Comparisons Assuming Higher Tax Rates**

It is unusual for an individual or a married couple in the 10% or 15% ordinary tax rate bracket to have enough income so that they can both invest the maximum allowed into their retirement account(s) and also invest some money into taxable accounts. In contrast, it is common if they are in the 25%, 28%, 33%, or 39.6% tax bracket.[[17]](#endnote-17) Next, scenario 1 will be rerun exchanging t = 25% and g = 15% from Table 1 with three new sets of tax rates (i.e., t = 28% and g = 15%; t = 36.8% and g = 18.8%; and t = 43.4% and g = 23.8%), but first the new tax rates will be explained. The first set of tax rates, with t = 28%, assumes that the taxpayer is in the next higher (above 25%) tax rate bracket and the 3.8% Medicare surtax on unearned income does not apply. The surtax can, but generally does not, apply to such taxpayers. The second set of tax rates assumes that the 33% ordinary tax rate is added together with the 3.8% Medicare surtax on interest income that applies when adjusted gross income is over $200,000 for an individual taxpayer filing single and over $250,000 if married filing jointly.[[18]](#endnote-18) Given such ordinary tax rate, the long-term capital gain and qualified dividend income tax rate is 18.8% (i.e., the 15% favorable tax rate added together with the 3.8% Medicare surtax). In reality, the surtax almost always applies to such taxpayers. The third set of tax rates assumes that both the 39.6% ordinary tax rate and the 20% favorable tax rate are added together with the 3.8% Medicare surtax, which is always the case when taxable income is this high. Table 3 reruns scenario 1 with these three new sets of tax rates, and also reruns scenario 2, again assuming the taxpayer drops into the next lower set of tax rate brackets as a result of retirement.

**Table 3**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Scenario 1** | **Scenario 2** | **Scenario 1** | **Scenario 2** | **Scenario 1** | **Scenario 2** |
| t | 28% | 28% | 36.8% | 36.8% | 43.4% | 43.4% |
| g | 15% | 15% | 18.8% | 18.8% | 23.8% | 23.8% |
| tn | 28% | 25% | 36.8% | 28% | 43.4% | 36.8% |
| gn | 15% | 15% | 18.8% | 15% | 23.8% | 18.8% |
| [1] ATFV: Stocks In – Bonds Out | $115,658 | $119,154 | $99,675 | $109,929 | $88,094 | $95,785 |
| [2] ATFV: Bonds In – Stocks Out | $111,626 | $113,269 | $95,477 | $101,879 | $82,607 | $88,066 |
| [1] – [2] = [3] Difference | $4,032 | $5,885 | $4,198 | $8,050 | $5,487 | $7,719 |
| [3] / [2] Percentage increase | 3.6% | 5.2% | 4.4% | 7.9% | 6.6% | 8.8% |

To summarize Table 3, Stocks In – Bonds Out again makes the taxpayer wealthier than Bonds In – Stocks Out in both scenarios for all three sets of tax rates. In the three cases of steady tax rates (scenario 1), Stocks In – Bonds Out improves wealth by between 3.6% and 6.6%. In the three cases of tax rates dropping one bracket at retirement (scenario 2), Stocks In – Bonds Out improves wealth by between 5.2% and 8.8%.

Next, in Table 4, Table 3’s three scenario 1’s (i.e., steady tax rates) will be rerun changing the assumption that the investment horizon is 20 years to either 30 years (the first three columns) or 10 years (the last three columns).

**Table 4**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Scenario 1 with n = 30** | **Scenario 1 with n = 30** | **Scenario 1 with n = 30** | **Scenario 1 with n = 10** | **Scenario 1 with n = 10** | **Scenario 1 with n = 10** |
| t | 28% | 36.8% | 43.4% | 28% | 36.8% | 43.4% |
| g | 15% | 18.8% | 23.8% | 15% | 18.8% | 23.8% |
| tn | 28% | 36.8% | 43.4% | 28% | 36.8% | 43.4% |
| gn | 15% | 18.8% | 23.8% | 15% | 18.8% | 23.8% |
| [1] ATFV: Stocks In – Bonds Out | $223,317 | $192,404 | $170,084 | $62,771 | $54,392 | $48,249 |
| [2] ATFV: Bonds In – Stocks Out | $207,636 | $175,593 | $149,625 | $62,125 | $53,794 | $47,312 |
| [1] – [2] = [3] Difference | $15,681 | $16,811 | $20,459 | $646 | $598 | $937 |
| [3] / [2] Percentage Increase | 7.6% | 9.6% | 13.7% | 1.0% | 1.1% | 2.0% |

Table 4’s results are consistent with the results in Table 2: the percentage by which Stocks In – Bonds Out increases wealth by more than Bonds In – Stocks Out when n is only 10 years is much slimmer, ranging from 1.0% to 2.0% (last three columns), than in Table 3 when n = 20 years; and when n increases to 30 years, then the percentage by which Stocks In – Bonds Out increases wealth is a lot larger, ranging from 7.6% to 13.7% (first three columns), than it was in Table 3 when n was only 20 years.

**Break-Even Analysis**

So should bonds ever be placed inside retirement accounts and stocks placed outside in taxable accounts? If a financial adviser expects the return on bonds to be substantially higher than 4% and/or the return on stocks to be substantially lower than 8%, then rerunning earlier scenarios with such revised returns could lead to the conclusion that the traditional view is correct: Bonds In – Stocks Out is wealth maximizing. The break-even lines in Figure 2 represent when the ATFV of Bonds In – Stocks Out equals Stocks In – Bonds Out given n = 20 years, the stock does not pay any annual dividends (i.e., the return on stocks is all appreciation), and the four most common sets of tax rates for relatively higher-tax-rate individuals (i.e., t = 25%, g = 15%; t = 28%, g = 15%; t = 36.8%, g = 18.8%; and t = 43.4%, g = 23.8%).[[19]](#endnote-19) If the combination of RS and RB is northwest of the break-even line, then Stocks In – Bonds Out is wealth maximizing, and if southeast of the break-even line, then Bonds In – Stocks Out is wealth maximizing.

**Figure 2: Break-Even Lines for the Returns on Stocks and Bonds Given that n = 20 Years**

The break-even lines for all four sets of tax rates are similar. The dashed line assumes that t is 25% and g is 15%. The dashed-dotted line assumes the ordinary tax rate is three percentage points higher (i.e., t = 28%) and g is 15%. Both lines, thus, assume the 3.8% Medicare surtax does not apply (i.e., adjusted gross income is not above $250,000 for a married couple filing one joint tax return and not above $200,000 for an individual with a single filing status). The indifference points are when RB = 4.0% and RS = 6.56% for the former tax rates and RS = 6.96% for the latter tax rates.

The dotted line assumes the ordinary tax rate is 36.8% (i.e., the 33% ordinary tax rate added together with the 3.8% Medicare surtax on interest income). Given such ordinary tax rate, the long-term capital gain income tax rate is 18.8% (i.e., the 15% favorable tax rate added together with the 3.8% Medicare surtax on long-term capital gain income). The dotted line is very similar to the dotted-dashed line (i.e., t = 28% and g = 15%). For instance, the indifference points are when RB = 4.0% and RS = 7.03% for the dotted line and RS = 6.96% for the dotted-dashed line.

The final break-even line to discuss is for a taxpayer in the highest possible federal tax rate bracket. Specifically, it is assumed that the ordinary tax rate is 43.4% (i.e., the 39.6% top ordinary tax rate added together with the 3.8% Medicare surtax on interest income) and the favorable long-term capital gain tax rate is 23.8% (i.e., the 20% top favorable tax rate added together with the 3.8% Medicare surtax on long-term capital gain income).[[20]](#endnote-20) This break-even line is solid, and it is very similar to the dashed line (i.e., t = 25% and g = 15%). In fact, the indifference points when RB = 4.0% are RS = 6.66% in the solid line and RS = 6.56% in the dashed line.

To summarize, the four break-even lines are similar, as the combination of tax rates ranges from t = 25% and g = 15% up to the highest possible tax rates of t = 43.4% and g = 23.8%. Assuming n = 20 years, all of the break-even lines are consistent with Stocks In – Bonds Out being the tax-efficient (i.e., wealth-maximizing) asset location strategy if RS is twice as large as RB, regardless of the level of RB.

**A Finer Breakdown of Taxable Bonds**

As mentioned earlier, Ibbotson (Morningstar, 2015) lists the returns on large-cap stocks, long-term corporate bonds, and long-term (federal) government bonds. In addition, it lists the returns on intermediate-term (federal) government bonds and federal government Treasury bills. The 2015 *Yearbook* shows that for the period January 1, 1926 through December 31, 2014, the geometric means of the annualized returns were 10.1%, 6.1%, 5.7%, 5.3%, and 3.5%, respectively. Reviewing the four break-even lines in Figure 2, if these historical averages still applied currently, the asset location of stocks versus long-term corporate bonds would result in little difference to after-tax wealth, given current income tax rate combinations. In contrast, federal government long-term and intermediate-term bonds outside retirement accounts and stocks inside retirement accounts would result in slightly higher after-tax wealth (i.e., RS = 10.1% and RB = either 5.7% or 5.3%), compared with the opposite locations, since these combinations of RS and RB lie slightly to the northwest of the four break-even lines in Figure 2. Finally, holding Treasury bills outside retirement accounts and stocks inside retirement accounts is wealth maximizing since RS of 10.1% and RB of 3.5% lies far northwest of the break-even lines in Figure 2. One takeaway for financial professionals is that at a minimum, breaking out taxable bonds between those with potentially higher and lower yields should be done and the latter category should be placed outside retirement accounts while stocks are placed inside retirement accounts for clients who invest more in a year than is allowed into all of such clients’ retirement accounts.

**Current Investing Environment and Implications for Asset Location**

Appropriate asset location is important for maximizing after-tax wealth. For an individual who invests both inside and outside retirement accounts, his or her financial planner can provide assistance about appropriate asset location. This article shows that appropriate advice is not as simple as “Put ordinary income-producing investments (i.e., taxable bonds) inside retirement accounts and hold tax-favored investments (i.e., stocks) outside of retirement accounts.” Instead, the scenarios in this article are broadly consistent with putting stocks inside retirement accounts if the stocks’ expected return is close to double or more of the expected return on bonds. There is one additional consideration regarding this rule of thumb. If stocks have a significant component of their expected return taxed annually (e.g., actively managed mutual funds making capital gain distributions; stocks that are not held for the long term, [i.e., not held greater than one year]; or high-dividend yield stocks), then it would be even more tax efficient to hold such stocks inside retirement accounts and bonds outside (i.e., bonds in taxable accounts).

That aside, is it reasonable in the current economic environment to assume an expected return on non-dividend-paying stocks that is double or more than that of investment-grade bonds? It might be. Support for the U.S. economy being in a “low return on bonds” environment includes the daily interest yield on 10-year U.S. Treasury notes having rarely been above 3.0% in the last few years (i.e., from the beginning of 2012 through the end of 2016), and having not been above 4.0% on 30-year U.S. Treasury bonds during the same time period. Additionally, the annual return on 10-year U.S. Treasury notes has averaged less than 2% in the same time period.

Arguably, a 30-year “bull market for bonds” ended around the beginning of this decade. During that time, the year-end yield on long-term government bonds went from 13.34% at the end of 1981 to 2.48% at the end of 2011. During these 30 years, for the one-year periods in which yields went down significantly, the return on bonds was very good. Today there is little, if any, such upside potential remaining in taxable bonds.

Granted, future returns on stocks and bonds are unknown, but macroeconomists often predict them, so it is reasonable that a financial adviser can have an appropriate basis for making a “stocks versus bonds asset location” recommendation. The only other piece of information a financial adviser needs to make a proper asset location recommendation is the client’s expected tax rates in the future.

**Reversibility of Stocks In – Bonds Out Asset Location**

Since Donald Trump was elected president, the interest yield on 10-year U.S. Treasury notes has risen from below 2.0% to approximately 2.5% (as of January 30, 2017). If the interest yield continues to rise to a much higher level, it raises the issue of needing to reverse the Stocks In – Bonds Out asset location strategy. In other words, if in the future a financial adviser believes that the expected return on bonds has become significantly closer to the expected return on stocks, what is the cost to undo the recommended strategy of Stocks In – Bonds Out? The answer is that the tax cost is minimal. Selling any stocks or stock-holding funds held inside a TDA or TEA and buying bond funds inside the retirement account with the proceeds triggers no tax. Further, selling bonds held outside the retirement account typically triggers little gain because the basis is close to the selling price. So using such proceeds to buy stocks or stock-holding funds is not hampered by the “lock-in effect” that impacts the decision to sell highly appreciated stocks held outside retirement accounts.

**Conclusion**

If a financial professional believes that in the current low-inflation environment the expected return on stocks is about double (or more than double) that of bonds, then the tax-efficient location is, in opposition to the traditional view, to place stocks in retirement accounts and bonds in taxable accounts (i.e., Stocks In – Bonds Out). It is true that the interest on the bonds will trigger tax at the ordinary rate each year. This is more than offset by the present value of the tax savings on the sale of the much higher return stocks held inside a retirement account. As Anderson and Murphy (2014) point out, it is not just tax rates but also rate of return on the investments and the investment horizon that determine proper asset location.

If inflation returns to its historical average of around 3% annually and the expected return on long-term taxable bonds also returns to its historical average of around 6%, then following the traditional view and reversing the Stocks In – Bonds Out asset location will be tax efficient. However, until then, following a Stocks In (i.e., inside retirement accounts) – Bonds Out (i.e., in taxable accounts) strategy for all but high-yield (i.e., junk) bonds is the wealth-maximizing strategy for almost every individual client that invests more in a year than is allowed inside the client’s retirement accounts.

**References**

# Anderson, Kenneth, and Daniel Murphy. 2014. “Stocks and Bonds: What to Put In and What to Leave Out of Individual Retirement Accounts and Qualified Plans.” *Journal of Financial Service Professionals* 68 (5) (September): 39–52.

Clements, Jonathan. 2016. *Jonathan Clements Money Guide 2016*. New York City, Jonathan Clements LLC.

Dammon, Robert M., Chester S. Spatt, and Harold H. Zhang. 2004. “Optimal Asset Location and Allocation with Taxable and Tax-Deferred Investing.” *Journal of Finance* 59 (3): 999–1037.

Daryanani, Gobind, and Chris Cordaro. 2005. “Asset Location: A Generic Framework for Maximizing After-Tax Wealth.” *Journal of Financial Planning* 18 (1): 44–54.

Geisler, Greg, and David Hulse. 2016. “The Taxation of Social Security Benefits and Planning Implications.” *Journal of Financial Planning* 29 (5): 52–63.

Horan, Stephen M., and Ashraf Al Zaman. 2008. “Tax-Adjusted Portfolio Optimization and Asset Location: Extensions and Synthesis.” *Journal of Wealth Management* 11 (3) (Winter): 56–73.

Hulse, David. 2004. “A Comparison of Taxable Accounts and IRAs for Holding Equity Investments.” *Journal of Taxation of Investments* 21 (2): 196–212.

Morningstar. 2015. “*Ibbotson SBBI 2015 Classic Yearbook: Market Results for Stocks, Bonds, Bills, and Inflation 1926–2014*. Chicago, IL. Morningstar, Inc.

Reichenstein, William. 2007a. “Implications of Principal, Risk, and Returns Sharing Across Savings Vehicles.” *Financial Services Review* 16: 1–17.

Reichenstein, William. 2007b. “Calculating After-Tax Asset Allocation Is Key to Determining Risk, Returns, and Asset Location.” *Journal of Financial Planning* 20 (7): 44–53.

Reichenstein, William, and William Meyer. 2013. “The Asset Location Decision Revisited.” *Journal of Financial Planning* 26 (11): 48–55.

Scholes, Myron, Mark Wolfson, Merle Erickson, Michelle Hanlon, Ed Maydew, and Terry Shevlin. 2013. *Taxes and Business Strategy: A Planning Approach*. Upper Saddle River, NJ. Pearson/Prentice Hall.

Shynkevich, Andrei. 2010. “Historical Performance of Asset Location Strategies and Its Implications for Investors’ Retirement Portfolios.” *Journal of Wealth Management* 13 (2) (Fall): 23–33.

Vanguard. 2015. “Saving for Retirement: ‘Location, Location, Location.’” <https://personal.vanguard.com/us/insights/article/ira-insights-location-032015>

1. For instance, in “Are You Holding Your Assets in the Right Types of Accounts,” by Christine Benz on Morningstar.com (3/2/17), the advice given was, “high-quality bonds and bond funds [are] a better fit for tax-sheltered accounts than for taxable accounts because their payouts are taxed at an investor’s ordinary income tax rate,” and “stocks and stock funds are generally a better bet for taxable accounts.” [↑](#endnote-ref-1)
2. This statement can be proven by plugging rates of return (R) and tax rates (t and g) into the five formulas in Figure 1 later in this article. The only two exceptions to the statement are a muni bond, which has the same after-tax return both inside and outside a retirement account, and the unusual case of a 401(k) or deductible IRA contribution when the tax rate is low followed by a distribution n years later when the tax rate is high. [↑](#endnote-ref-2)
3. The Federal Reserve Bank of Cleveland’s latest inflation expectations (as of March 1, 2017) are the following: 1.9% for the next ten years, 2.1% for the next 20 years, and 2.2% for the next 30 years. (Source: <https://www.clevelandfed.org/our-research/indicators-and-data/inflation-expectations.aspx>.) Vanguard’s 2017 outlook is that taxable bonds will yield about 2.5% (with expected increases in interest rates, the return on bonds will be less), while stocks will earn double to triple that 2.5% rate. (Source: https://personal.vanguard.com/us/insights/article/VEMO-global-outlook-122016.) As further support, Vanguard’s median expectation for the ten-year nominal return on a globally diversified portfolio of 80% stocks and 20% bonds is 6.6% and on 20% stocks and 80% bonds is 3.3%, returns consistent with stocks earning more than double the return of bonds. (Source: “2017 Economic and Market Outlook,” available at the same location as above.) [↑](#endnote-ref-3)
4. Muni bonds are not considered in this article because it is never tax-efficient to own muni bonds inside of a retirement account. In other words, since there are limited amounts that can be contributed to retirement accounts each year and earnings on investments are not taxed when inside a retirement account, investments that trigger income tax if held or sold outside of a retirement account should be the investment choice for inside retirement accounts. [↑](#endnote-ref-4)
5. These formulas are adapted from Scholes et al. (2013). [↑](#endnote-ref-5)
6. The Ibbotson yearbook provides both the geometric and arithmetic means. The former is 10.1% for large-cap stocks and the latter is 12.1% for such stocks. The geometric mean is used instead of the arithmetic mean since the former appropriately accounts for how returns compound over time. [↑](#endnote-ref-6)
7. In 2017, $24,000 is the maximum 401(k) contribution allowed by an employee age 50 or over. [↑](#endnote-ref-7)
8. The dividend yield is assumed to be 2.0% because in the last five years (2012 through 2016) the dividend yield on the S&P 500 has averaged approximately 2.0%. [↑](#endnote-ref-8)
9. For simplicity, marginal tax rates are used in the formulas and the analysis. Another assumption thus is that the taxpayer has other ordinary income, besides the TDA distribution, that offsets deductions and utilizes the lower tax rate brackets. Also, see Geisler and Hulse (2016) for discussion of how taxpayers receiving social security can be subject to the “tax torpedo,” which causes significantly higher marginal tax rates in retirement even if the taxpayer is no longer collecting a salary. [↑](#endnote-ref-9)
10. The formula for this hybrid of models 2 and 3 is adapted from Hulse (2004). It is the following:

    ATFV = AT$(1 + R − Rdg)n – gn{AT$(1 + R − Rdg)n – AT$[(1 − d + (1 + R − Rdg)n d(1 − g)) / (1 − dg)]}

    where d is the percentage of R that is annual qualified dividends and, thus, 1 – d is the percentage of R that is appreciation (i.e., unrealized gain) and taxed in year n (i.e., at sale) when stocks are held in a taxable account. All of the other variables are defined at the end of Table 1. [↑](#endnote-ref-10)
11. This hybrid formula is not intuitive, particularly the last part of the formula that is inside the square brackets. The first part of the formula (i.e., AT$(1 + R − Rdg)n) is the amount that the stock grows to in 20 years after paying annual tax (at a 15% rate) on the dividend (2%). After paying such tax, which is 0.3% (i.e., 15% × 2%) of the 8% return, the annual appreciation is 7.7% for the next 20 years (i.e., $18,750 grows to $82,664) since the after-tax dividends are reinvested in the stock. The next term is the 15% tax rate (gn) multiplied by the long-term capital gain. In other words, 15% is followed by the gain, the selling price (i.e., $82,664) minus the tax basis of the stock (i.e., the rest of the formula, beginning with “– AT$”). Such basis begins at $18,750 but then grows by the annual after-tax dividends reinvested in the stock. Over the course of 20 years, the basis goes from $18,750 to $32,861. The long-term capital gain thus is $49,803 (i.e., $82,664 − $32,861) and the tax on it is 15%, which results in $7,471 tax. The selling price of $82,664 minus the tax at sale of $7,471 results in $75,193. [↑](#endnote-ref-11)
12. Granted, the Stocks In – Bonds Out strategy might not enhance wealth if the actual returns on stocks are relatively low and/or the actual returns on bonds are relatively high. [↑](#endnote-ref-12)
13. If instead of one-quarter of the 8% return on stocks being dividends it is assumed that either one-half is dividends or none is dividends, then in the former case, there is a greater disadvantage to stocks being held outside retirement accounts. Specifically, Stocks In – Bonds Out is still $121,258 but Bonds In – Stocks Out is less (i.e., $114,443) since the higher rate of dividends causes more income to be taxed annually. Stocks In – Bonds Out, thus, is almost 6.0% higher. In the latter case, there is less of a disadvantage to stocks being held outside retirement accounts because there is no annual taxation. Instead, the entire return is taxed at the end of the investment horizon (i.e., n = 20 years) at the lower than ordinary tax rate (i.e., g = 15%). Specifically, Stocks In – Bonds Out is still $121,258 but Bonds In – Stocks Out is more (i.e., $118,180). Stocks In – Bonds Out, thus, is only 2.6% higher. In conclusion, Stocks In – Bonds Out is the wealth-maximizing strategy given the return on stocks is 8% and the return on taxable bonds is 4%, regardless of the dividend yield on the stocks being between 0% and a very high yield (one-half of 8%). [↑](#endnote-ref-13)
14. A discussion about the differences between t versus tn and g versus gn is necessary. For simplicity (i.e., to avoid modifying the formulas in Figure 1), n is assumed to be the day after the number of years ends. For instance, t = 25% for the entire 20 years when ordinary income is taxed and g = 15% for the entire 20 years when qualified dividend income is taxed and the taxation occurs on the last day of the year (i.e., December 31). However, it is assumed that the distribution or sale occurs on the first day of year 21 (i.e., January 1) and the rates on ordinary income (tn = 35%) and long-term capital gain income (gn = 18.8%) are higher. The effect is that in the 20th year the same tax rate applies that has applied for the previous 19 years on the year’s income but the sale of the stock mutual fund held in the taxable account or distribution from the 401(k) occurs when the tax rate is significantly higher. For simplicity, the tax payment on the first day of year 21 is assumed to occur immediately and the difference in present value from the last day of year 20 to the first day of year 21 is ignored.

    [↑](#endnote-ref-14)
15. Since gn = 0%, the latter term in this hybrid model drops out (i.e., subtract $0 long-term capital gains tax). [↑](#endnote-ref-15)
16. The reason the $25,000 invested inside the Roth retirement account is not put entirely in stocks is to make the comparison with scenario 1 fair, since stocks have an 8% return while bonds have only a 4% return. In scenario 1, $18,750 after tax is put into the tax-deferred retirement account and invested in stocks and $18,750 after tax is put into the taxable account and invested in bonds. In scenario 3, $18,750 after tax is also put into the Roth retirement account and invested in stocks. [↑](#endnote-ref-16)
17. The 35% tax rate bracket is ignored for brevity and because very few taxpayers are in that bracket, since its range of taxable income is narrow. For example, for an individual with a single filing status in 2016, the 35% tax rate bracket is especially narrow, as it applies only to taxable income between $413,350 and $415,050. [↑](#endnote-ref-17)
18. The 3.8% Medicare surtax on investment income applies to *almost* all income taxpayers in the 33% ordinary income tax rate bracket. [↑](#endnote-ref-18)
19. The break-even line is based on the following formula from appendix 2 of Anderson and Murphy (2014):

    RS = [[(1 + RB)n – [1 + RB(1 − t)]n + g] / g]1/n − 1 [↑](#endnote-ref-19)
20. The 3.8% Medicare surtax on investment income applies to all individual taxpayers in the 39.6% ordinary income tax rate bracket. [↑](#endnote-ref-20)