The Roth Versus The Traditional IRA: A Comparative Analysis

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Abstract

This study provides economic analyses that allow wealth accumulation comparisons between a traditional IRA and Roth IRA. We performed economic analyses involving an investor with fixed pre-tax earnings or wealth available to invest in either the traditional or the Roth IRA, but not both. These analyses have shown that the traditional IRA has significant wealth accumulation advantages over the Roth IRA in all but rare circumstances. In our analyses, the traditional IRA outperforms the Roth IRA by accumulating more wealth available at retirement. Thus, our findings demonstrate that the Roth IRA is inferior to the traditional IRA as a wealth accumulation vehicle in all but rare circumstances.

Introduction

One of the much-publicized provisions of the Taxpayer Relief Act of 1997 was the creation of a new Individual Retirement Account (IRA) known as the Roth IRA.1 The Roth IRA resulted from the national debate over the need to stimulate individual or personal savings. This need to stimulate savings, in turn, was a response to the perceived over-reliance on Social Security for retirement income and to the economic benefits of increasing personal savings.

The Roth IRA is available to taxpayers for tax years beginning in 1998. The most publicized benefits of the Roth IRA are: (1) tax-free distributions under qualifying circumstances, (2) the right to pass accumulations through one’s estate,2 and (3) the wider availability of this investment vehicle to many who otherwise do not qualify for a traditional IRA (due to income limitations or participation in an employer-sponsored pension plan). The attractiveness of the Roth IRA comes primarily from the fact that earnings can accumulate and be distributed without tax consequences. All contributions are made on an after-tax basis and, thus, are not taxed again at distribution.3 Obviously, the increase in the availability of this tax-preferred saving vehicle to more individuals is a substantial and intended macroeconomic benefit.

Evidence from the financial press, the substantial promotion of mutual fund companies, brokerage houses, banks, and financial and tax advisors, and the academic and professional literature suggest that some misconceptions exist about the benefits of the Roth IRA vis-a-vis the traditional IRA. For example, many brokerage houses provide web sites that promote the Roth IRA as an alternative for those investors who would otherwise qualify for a traditional IRA, even though the latter might be optimal. Addi-

Readers with comments or questions are encouraged to contact the author via email.
tionally, much promotional effort has been directed toward investors who are eligible to roll over accumulations from a traditional IRA into a Roth IRA. Finally, some of the academic and professional literature has made incorrect financial comparisons between the two IRA structures. A recent article presented an in-depth analysis of the Roth versus traditional IRA decision, but the article’s models assume that a portion of the taxpayer’s initial wealth endowment be used to fund non-IRA-instruments. This assumption introduces noise into the analysis and, in some situations, can lead to incorrect conclusions. Thus, we correct that assumption and provide substantial new insight into the nature of wealth accumulation in a Roth IRA as compared to a traditional IRA.

This study provides economic analyses that allow wealth accumulation comparisons between a traditional IRA and Roth IRA. The comparisons require the same economic sacrifice or investor forbearance. When comparing investment alternatives, it is crucial that the potential investments being compared require the same economic sacrifice by the investor. Since earnings contributed to a traditional IRA are before tax, but earnings contributed to a Roth IRA are after tax, identical economic sacrifice by the investor does not translate into equal initial investments in the two IRA structures. This paper also focuses on the marginal tax rates (MTR) of the investor during the earnings and contribution period in comparison to the MTR of the same investor at the point of withdrawal. This requires three sets of simulations: comparisons of the wealth accumulation in the Roth and traditional IRA assuming (1) MTRs are greater at the contribution date than at the withdrawal date, (2) MTRs are equal at the contribution and withdrawal dates, and (3) the unusual circumstances where MTRs are greater at withdrawal than at the date of contribution. Thus, these scenarios capture all potential events, but are presented in the order of the most likely to the least likely occurrence.

Background

The Roth IRA requirements appear in Section 408A of the Internal Revenue Code (IRC), as amended by the Taxpayer Relief Act of 1997 and the Technical Corrections Act of 1997. Roth IRAs can be created or increased by nondeductible contributions or a rollover from a traditional IRA. Contributions to IRAs are limited to $2,000 annually or to the earned income of the taxpayer, whichever is less. That is, the maximum that can be contributed in the aggregate to a Roth IRA, a traditional IRA, or a nondeductible traditional IRA is $2,000 each year. The Roth IRA must remain invested for a minimum of five years to be considered a qualified withdrawal, while the traditional IRA can be withdrawn at any time (subject to possible penalty).

Broader taxpayer participation is an important macroeconomic advantage of the Roth IRA. Though all contributions to the Roth IRA are subject to income limitations, the limitations are more generous than for the traditional IRA. Thus, a Roth IRA investment is possible for a much larger group of taxpayers. Phase-out rules for single individuals occur at income levels between $95,000 and $110,000, and, for taxpayers filing jointly, the phase-out occurs between $150,000 and $160,000. Broader participation also is encouraged due to the eligibility of nonworking spouses who can contribute $2,000 annually to the Roth IRA if the combined compensation of worker and spouse is at least equal to their total IRA contributions. Since nonworking spouses could contribute only $250 under prior regulations, this change increases the number of nonworking spouses who are eligible to establish a Roth IRA. In contrast to a traditional IRA where contributions are not allowed past age 70 1/2, contributions to a Roth IRA can be made at any age, provided that the taxpayer has earned income.

Rollover contributions from a traditional IRA to a Roth IRA are permitted and are pro-
moted by various investment intermediaries. Assets from an existing traditional IRA can be converted to a Roth IRA if adjusted gross income (AGI) is less than $100,000 and the taxpayers are not married and filing separate tax returns. However, the financial implications of these rollovers appear to be misunderstood. The fact that the accumulations in a traditional IRA are subject to tax (but not penalty) at the time they are rolled over into a Roth IRA is a substantial and overwhelming financial disadvantage of this type of transaction, despite its widespread promotion. As an added incentive to entice taxpayers to make the conversion, a special one-time rule allows the tax due on a conversion made in 1998 to be paid ratably over the following four years.

Many analyses of the Roth IRA quickly gloss over a discussion of the current tax that must be paid on the conversion. Consider a taxpayer with $100,000 in a traditional IRA who decides to make the conversion. If the taxpayer’s marginal tax rate is 36%, the tax due is $36,000. The government allows this tax bill to be paid in four $9,000 installments; no interest is charged. If the taxpayer does not have the cash on hand to pay the tax bill on conversion, the cash will likely come from either: (1) borrowed funds or (2) proceeds from the traditional IRA that was converted. In the latter case, any proceeds not rolled over result in a nonqualified distribution, and the amount used to pay the taxes due are subject to a 10% penalty.

Method of Analyses

To determine the wealth accumulation advantages of the two IRA savings arrangements under varying MTRs and withdrawal circumstances, we conducted analyses holding the amount of economic sacrifice or wealth forbearance constant, i.e., to an investor, the amount of income or wealth they give up is the real investment. To perform proper economic analyses, we could have chosen any constant amount of sacrifice, as long as it does not exceed $2,000. For convenience, we chose an economic situation in which the taxpayer has $1,000 of pre-tax earnings available for investment in either a traditional or a Roth IRA, both earning a ten percent (10%) annual rate of return, compounded annually. Since contributions to the traditional IRA are on a before-tax basis, the entire $1,000 is available to invest. However, contributions to the Roth IRA are on an after-tax basis; so the amount available to invest is the $1,000 of pre-tax wealth or earnings reduced by the taxes due at the applicable MTR. This means that the actual amount invested in each plan differs, but the actual amount of earnings necessary to fund both investments is equal; that is, economic sacrifice or forbearance are identical for the two alternative IRA forms.

The analyses are conducted using three assumptions about the differences between the MTRs of the investor on the date of contribution and on the date of withdrawal. Specifically, we performed analyses assuming a higher MTR on the date of contribution than on the date of withdrawal, which is the most likely occurrence, equal MTRs on the contribution and withdrawal dates, and higher MTRs on the date of withdrawal than on the date of contribution. In each of these three sets of circumstances, we examined both qualified and nonqualified withdrawals. In this manner, all effects of changes in the direction of the MTR could be determined. We ran all of our analyses using the statutory rates of 15% and 28%. Taxpayer’s with MTRs greater than 28% generally are ineligible to make deductible contributions to a traditional IRA, and these higher MTRs would not affect our results.

Results

Qualified Withdrawals

In this section, we present the results of our analyses assuming all withdrawals are qualified (e.g., received after age 59 1/2). As a result, no penalty is due on distributions from either the
traditional or Roth IRA. Contributions to the traditional IRA are deductible, while qualified withdrawals are taxable. For the Roth IRA, contributions are nondeductible while qualified withdrawals are tax-exempt.

Marginal Tax Rate Greater at Contribution. Figure 1 demonstrates that, when the MTR at the date of contribution, the traditional IRA produces the greater retirement wealth. This is the most-likely scenario for most people. Individuals normally experience their greatest MTRs during the years when they are working and contributing to their retirement. After retirement, they face lower MTRs as they receive distributions from their IRAs.
In Figure 1, the traditional IRA produces the greater net after-tax payout from year one forward. After ten years, this difference is more than $300, or 30% of the initial $1,000 earned. Multiples of the $1,000 earned and invested (assuming 1 at the figure’s bottom) have a corresponding multiple effect on the magnitude of this $300 difference. Since the magnitude of the difference is dependent on the MTRs and the investment return assumed, the advantage of the traditional IRA will increase as the investment return increases and will increases as the MTR increases.

Equal Marginal Tax Rates. Our analyses indicate that when the MTR at the withdrawal date is equal to the MTR at the contribution date, economic wealth accumulation for withdrawals after age 59 ½ is the same for the traditional and Roth IRAs (once the Roth IRA is in existence for five years). Circumstances which may lead to equal MTRs at the contribution and withdrawal dates include: (1) possible changes in the tax law, (2) taxpayers continuing their employment past the normal retirement age, and (3) significant investment income during retirement years. Figure 2 shows that, at a MTR of 15%, a $1,000 investment produces the same net-of-tax payout for both the traditional and Roth IRA. Figure 3 reveals a similar pattern when the taxpayer’s MTR is 28%. In fact, this result will be the same whenever the MTRs at contribution and withdrawal are the same, whatever their amount.

Note that during years 1 - 5, the difference in payout between the Roth IRA and the traditional IRA starts out small, is maximized in the fifth year, and eliminated thereafter. This result occurs because any withdrawal from a Roth IRA during the first five years is unqualified. As an unqualified withdrawal, it is subject to an early withdrawal penalty, regardless of the investor’s age. The payout difference in years 1 - 5 is entirely attributable to this early withdrawal penalty (in every figure corresponding to payouts after age 59 ½, the graph for the Roth IRA will be “kinked” at the fifth year due to this early withdrawal penalty). Thus, for withdrawals during the first five years, the traditional IRA is superior to the Roth IRA because of the negative wealth effect on Roth IRA withdrawals during the first five years of investment.

Marginal Tax Rate Greater at Withdrawal. Figure 4 illustrates that, for withdrawals after the age of 59 ½, the Roth IRA is superior if a taxpayer faces the anomalous situation of a withdrawal MTR that is greater than the MTR at the contribution date. This MTR configuration can arise when taxpayers work past their normal retirement ages, the tax law changes, a small business owner becomes successful after retirement, or when taxpayers have large amounts of investment income during retirement.

The Roth IRA achieves its superiority in this situation because its owner’s earnings are, in effect, taxed when contributed (at the lower MTR). In contrast, the traditional IRA owner’s earnings are, in effect, taxed when withdrawn (at the higher MTR). The early withdrawal penalty during the first five years results in payouts being approximately equal in the fifth year. However, after ten years, the Roth is superior by more than $300, a magnitude greater than 30% of the initial pre-invested earnings.

When the MTRs at contribution and withdrawal differ by 13 percentage points (as in Figure 4), the Roth IRA is superior every year, from year one. When the difference between MTRs is, say, 3 percentage points (MTR of 28% at contribution and 31% at withdrawal), the traditional IRA is superior initially, but eventually is overtaken by the Roth. Again, the magnitude and the sign of the difference between the Roth and the traditional IRA is dependent on the spread of MTRs at contribution and withdrawal, as well as the rate of investment return.
Nonqualified Withdrawals

In this section, we present the results for nonqualified withdrawals. Nonqualified withdrawals occur prior to the owner attaining the age of 59 1/2 or otherwise not meeting the requirements discussed earlier. An early withdrawal penalty applies to nonqualified withdrawals from both traditional and Roth IRAs. In addition, all nonqualified withdrawals from traditional IRAs and nonqualified withdrawals of investment earnings from Roth IRAs are taxable.

Marginal Tax Rate Greater at Contribution. Figure 5 illustrates a normal scenario where the MTR at contribution is greater than the MTR at
withdrawal. In this situation, the traditional IRA is better from day one. After ten years, the difference between the traditional and the Roth IRA is approximately $365. Indeed, when the MTR at the date of contribution is greater than eight percentage points above the MTR at the date of withdrawal, the traditional IRA always produces a higher net-of-tax-and-penalties payout than the Roth IRA.

Equal Marginal Tax Rates. Figure 6 illustrates that when the MTR at the date of contribution and withdrawal are equal at 28%, the Roth IRA produces a greater net payout, after penalties, than does the traditional IRA for the first four
years. However, by year five, the traditional IRA produces a higher payout, after tax and penalties. The break-even point is at approximately 4.8 years. After ten years, the traditional IRA is superior by a magnitude of approximately $175.

Figure 7 shows that when the MTRs are equal at 15%, the break-even point occurs at approximately 6.6 years, with the traditional IRA dominating after this point. After ten years, the traditional IRA is superior by a magnitude of approximately $80. The magnitude of the difference is a function of the MTRs at the contribution and withdrawal dates and the rate of investment return.

The investment life necessary for the wealth accumulation in a traditional IRA to exceed that
of the Roth IRA is the break-even point and is somewhat sensitive to the investment earnings rate. Generally, the break-even point varies inversely with the rate of return. That is, the traditional IRA has higher initial investment amounts; thus, the advantages of the traditional IRA are enhanced relative to the Roth IRA at higher investment rates of return.

Marginal Tax Rate Greater at Withdrawal. Figure 8 illustrates that even when the MTR at the date of withdrawal is 28%, and the MTR at the date of contribution is 15%, a 13 percentage point difference, the Roth IRA is initially superior, but the traditional IRA overtakes the Roth IRA during the fourteenth year. At year 14, the traditional IRA is superior by a magnitude of approximately $50.

More Break-Even Analysis

The Roth IRA is sometimes superior in early withdrawal situations and should be considered if an investor is planning to withdraw IRA funds early (or otherwise believes it may be necessary). As illustrated above in Figures 6
and 7, the traditional IRA dominates the Roth IRA when withdrawals are nonqualified only after a certain number of investment years. Figure 9 illustrates the years to break-even (the point when the traditional IRA becomes superior) for two different levels of MTRs (15% and 28%) as well as for investment rates of return from 5% to 25%.

Figure 9 illustrates that the Roth IRA's benefit in an early withdrawal situation is primarily for those subject to low MTRs who are able to earn relatively small investment returns. For example, when an investor faces a MTR of 15% (the top curve) and a 5% rate of return, the Roth is superior to the traditional IRA for the first 13 years. However, for taxpayers subject to
higher MTRs (the lower curve) and who are able to earn higher returns, the traditional IRA overtakes the Roth IRA very quickly. For example, the Roth is superior to the traditional IRA only for the first 2 years when the MTR is 28% and the assumed rate of return is 25%. The traditional IRA is thus superior in cases of long investment horizons.

Summary and Conclusions

The analyses in this paper compare a traditional IRA to a Roth IRA as alternative investment vehicles to determine the circumstances under which each has wealth accumulation advantages. We performed economic analyses involving an investor with fixed pre-tax earnings or wealth available to invest in either the tradi-
tional or the Roth IRA, but not both. The invest-
ment alternatives assumed rates of return, and relationships between the MTRs in effect at the time of contribution and the time of with-
drawal, i.e., lower, equal, and higher MTRs at withdrawal than at contribution. Additionally, we examined the case of early withdrawal with penalty separately from the normal or qualified withdrawals.

The analyses have shown that the traditional IRA has significant wealth accumulation advantages over the Roth IRA in all but rare circum-
cstances. Since many retirees expect to use the IRA for retirement income and expect lower
MTRs at retirement, we believe this to be the most likely retirement planning assumption. In our analyses, the traditional IRA outperforms the Roth IRA by accumulating more wealth available at retirement. When the investor's MTR at contribution and retirement are equal, the traditional IRA outperforms the Roth during the first five years of investment life and is the same thereafter. In the unlikely event that the investor's MTR is greater at withdrawal than at contribution by at least 13 percentage points, the Roth IRA is superior at retirement. However, when the MTR at withdrawal is less than 13 percentage points greater than the MTR at contribution, the traditional IRA will be superior initially, but will be overtaken by the Roth IRA, i.e., at MTR differences below 13 percentage points the

Figure 9
Break-Even Points For Early Withdrawals at Various MTRs and Rates of Return

(1) MTRs are equal at contribution and withdrawal.
(2) All cases shown are for early withdrawal.
break-even point is positively related to the size of the difference.

In an early withdrawal situation, the traditional IRA is superior in the most likely case where the MTRs at contribution are higher than at withdrawal. However, when the MTRs at contribution and withdrawal are identical, the Roth IRA exhibits superiority in the early years of the investment but is overtaken by the traditional IRA, i.e., the break-even point at which the traditional IRA accumulates more wealth than the Roth IRA is dependent on the size of the MTR and the investment rate of return. Again, in the unlikely event that MTRs at withdrawal are larger than at contribution, the Roth IRA is superior in the early years, but is eventually overtaken by the traditional IRA.

Thus, our findings demonstrate that it is not true that the Roth IRA is superior to the traditional IRA as an alternative investment vehicle in all but rare circumstances. It follows from this analysis that a rollover from a traditional IRA to a Roth IRA will always be disadvantageous, notwithstanding the advertisements by market intermediaries promoting these rollovers. This disadvantage would be significant given that the traditional IRA demonstrates superiority in the most common situations and that a rollover would require taxes to be paid on the distribution prior to investment in the Roth IRA.

The introduction of the Roth IRA may provide significant macroeconomic benefits by stimulating savings by individuals who are not qualified to use a traditional IRA. However, the two forms of IRA investment vehicles demonstrate substantially different wealth accumulation characteristics that they should be considered with great care. In most circumstances when an investor has the choice of the two forms, the greater wealth will be accumulated for retirement in the traditional IRA.

**Suggestions For Future Research**

Given that the traditional IRA is superior to the Roth in most situations, it appears as if many investors, perhaps acting on erroneous advice from market intermediaries, have made suboptimal investment decisions. It would logically follow that litigation will ensue, based on alleged malpractice. A potentially fruitful area of future research would be an analysis of this ensuing litigation.

**Endnotes**

1. Public Law No. 105-34, 111 Stat. 788 (1997), sec. 302(a), which added Internal Revenue Code Sec. 408A.
2. Another of the potentially significant benefits of the Roth IRA is that in contrast to a traditional IRA or other qualified plan, no distributions are required from a Roth IRA during the owner’s lifetime. The assets in the Roth IRA can remain in the IRA and continue to grow tax-free until the owner’s death. After the owner’s death, the Roth beneficiaries are required to take distributions in accordance with the minimum distribution rules for a traditional IRA. These distributions too are 100% tax-free.
3. Qualified distributions from a Roth IRA can be received tax-free in the following circumstances: (1) any time after the owner reaches age 59 1/2, (2) any time after the owner becomes disabled, (3) to a beneficiary after the owner’s death, (4) to pay qualified higher education expenses, (5) to pay first-time home buyer expenses (lifetime limit of $10,000) for the owner of the IRA or the owner’s spouse, children, or grandchildren. Notwithstanding the five situations above, distributions can be received tax-free only if the Roth IRA has been held for at least five years. Distributions not described above are nonqualified and, thus, includable in gross income to the extent paid from earnings. All distributions are deemed to come first from contributions; that is, no gross in-
come results until nonqualified distributions exceed past contributions. However, all nonqualified distributions (whether from contributions or from earnings) are subject to the 10% penalty.


5. In an attempt to increase the group of taxpayers eligible for the rollover, Amendment No. 2339 to the Internal Revenue Service Restructuring and Reform Act of 1998 was passed and excludes required minimum distributions from a taxpayers AGI solely for purposes of determining eligibility for the conversion. This will allow wealthy retirees, whose AGI is greater than $100,000 because of minimum distribution requirements, to participate in a rollover.

6. For purposes of the AGI threshold, the amount of the traditional IRA that is required to be taken into income as a result of the conversion is not counted toward the AGI threshold amount (AGI is computed without regard to the value of the included IRA assets).

7. When an investor is qualified to invest in either a Roth IRA or a traditional IRA, there are many issues, specific to that investor's unique circumstances that potentially impact the analyses. For example, if the investor is making maximum contributions to a Keogh, 401 (k), 403 (b) or other qualified plan, the Roth IRA is still available for additional savings but the traditional IRA is not. Additionally, it may be important to some investors that the distributions from a traditional IRA are included in Adjusted Gross Income (AGI) while those from a Roth IRA are not. Additions to AGI can (1) raise the floor amounts for itemized deductions such as medical and miscellaneous employee expenses, (2) potentially impact the phase-out of itemized deductions and dependency exemptions and/or (3) increase the amounts of Social Security benefits that are subject to tax. However, the potential impact of these three items is on the most affluent of retirees and those who do not itemize, do not have dependents or employee expenses may not be significantly affected by the increase in AGI due to traditional IRA distributions. This is especially true if the distributions are annuitized and withdrawn over the life of the retiree.

8. This method differs significantly from that used in some other analyses, which attempt to model a maximum contribution of $2,000 to both the Roth and the traditional IRA. To illustrate these other approaches, assume a taxpayer's MTR is 15%. To fully fund a Roth IRA at $2,000, the taxpayer requires an initial economic wealth endowment of $2,352.94 ($2,000/.85), which is assumed to be taxable income. From this initial endowment, the taxpayer pays tax of $352.94, leaving $2,000 to invest in the Roth IRA. Alternatively, the taxpayer can invest $2,000 of her initial $2,352.94 of economic wealth in the traditional IRA, leaving her $352.94. Taxes of $52.94 ($352.94 x .15) are paid on the income not invested in the IRA, leaving the taxpayer with $300 to invest in something other than an IRA. However, the portion of initial economic wealth that is required to grow outside of the tax-deferred IRA (i.e., the $300 in our example) introduces noise into the analysis; indeed, it is this component that is driving many of the Roth IRA recommendations. In contrast, our approach evaluates the two IRA alternatives at a level of equal economic wealth sacrifice that allows 100% of the economic wealth to be invested in the traditional IRA.

9. The Roth IRA possesses additional advantages. The Roth IRA is available to a larger number of taxpayers. Taxpayers who participate in a Keogh, 401(k), 403(b), or other qualified plan also can participate in a Roth IRA, even after making maximum contributions to their other plans. The higher income limitations of the Roth IRA make it available to a larger number of taxpayers.
For many taxpayers, this is perhaps the greatest attraction of the Roth IRA. Another advantage of the Roth IRA relates to the nature of distributions. Taxable distributions from a traditional IRA are includible in gross income and, therefore, increase the taxpayer’s AGI. An increased AGI can have several negative effects, such as: (1) raising the floor amounts for itemized deductions like medical and miscellaneous employee expenses, (2) triggering or increasing the phase-out of itemized deductions and dependency exemptions, and (3) increasing the amount of Social Security benefits that are subject to taxation. In contrast, distributions from a Roth IRA are excludable from gross income and, as such, do not trigger any of these negative consequences.

Notes