The Taxation of Retirement Saving:

Choosing Between Front-Loaded and Back-Loaded Options*

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ABSTRACT

We examine retirement savers' choices between front- and back-loaded tax incentives, such as traditional and Roth IRAs, respectively. With equal dollar contribution limits, back-loaded plans shelter more funds than front-loaded plans. This implies that Roth IRAs can be the preferred choice even for investors who expect their tax rates to fall in retirement. Empirically, we examine how marginal tax rates have varied between 1982 and 1995 for a sample of taxpayers and calculate both ex ante and ex post effective tax rates on front-loaded IRAs. The average effective tax rate on traditional IRA contributions made in 1982 and withdrawn in 1995 was negative 30 percent. Changes in tax law after 1982 reduced tax rates considerably. Holding tax law constant, the average effective tax rate on IRAs was about negative 11 percent. These results occur because the tax rate in retirement is lower for most people than the rate while working. In contrast, the effective tax rate on Roth IRAs is always zero. Despite the lower average effective tax rate on traditional IRAs, many taxpayers in the sample would have benefited from contributing to a Roth IRA instead of a traditional IRA, due to the difference in effective contribution limits.

I. Introduction

In the United States, most tax incentives for saving are "front-loaded." In a front-loaded plan, contributions are tax-deductible, the account balances accrue tax-free, and qualified withdrawals are taxed as ordinary income. Traditional Individual Retirement Accounts (IRAs), 401(k)s plans, and Keogh plans satisfy these conditions.

The Taxpayer Relief Act of 1997 created a new saving instrument—the Roth IRA—which is back-loaded.[1] Although both traditional and Roth IRAs permit balances to grow tax-free, contributions to Roth IRAs are not deductible, and qualified withdrawals are not taxed.

Back-loaded saving incentives have attracted significant interest. By June 2000, over 10 million U.S. households owned at least one Roth IRA (Investment Company Institute 2000). Back-loaded plans have also received continuing legislative attention. In 1999, proposed legislation would have created a "Roth 401(k)" (Tax Analysts 1999). The Economic Growth and Tax Relief Reconciliation Act of 2001 raises the contribution limits for both Roth and traditional IRAs and introduces a Roth 401(k) (Joint Committee on Taxation 2001).

The choice between front- and back-loaded saving incentives is a relevant issue for any household that is saving for retirement. For example, the tens of millions of households that participate in traditional IRAs and/or 401(k) plans could shift some or all of their contributions to

[1] The Roth IRA is named after Senator William Roth (R-DE), who was chairman of the Senate Finance Committee in 1997, and who championed the program. When enacted, the program was widely derided as a budget gimmick, for at least two reasons. First, compared to traditional IRAs, most of the revenue losses occur outside the 5- or 10-year budget windows then in effect and thus would not count as a tax cut for budget-scoring purposes. Second, TRA 97 also gave taxpayers incentives to convert their traditional IRAs into Roths in 1998. This raised short-term revenues, since the conversions triggered tax payments, but reduced long-term revenues by far more. Thus, Steuerle (1997) notes that "Almost everyone recognizes that they [Roth IRAs] were enacted partly because of perverse budget accounting that does not take into account long-term effects of the deficit." Halperin (1998) argues that "…the main purpose of the Roth alternative was to hide the budget cost."

back-loaded plans. Among Roth IRA holders in 2000, 77 percent participated in a defined contribution plan, and 59 percent owned a traditional IRA (Investment Company Institute 2000). With the expansion of contribution limits and introduction of Roth 401(k)s in the 2001 tax act, these households will be able to choose where to deposit additional tax-sheltered saving.

In this paper, we address two questions created by the simultaneous existence of front- and back-loaded incentives for saving: theoretically, under what circumstances would an investor prefer a front-loaded incentive over a back-loaded incentive? Empirically, how many households meet those conditions?

With equal amounts of tax sheltering in each plan, the choice between front- and back-loaded incentives depends only on whether the current tax rate is above or below the expected future tax rate. However, if the front- and back-loaded plans have the same actual contribution limit in dollars, the back-loaded plan effectively allows the investor to shelter more funds. In this situation, the investor may prefer the back-loaded plan even if the current tax rate exceeds the future tax rate. We derive theoretical conditions relating the choice of a front-loaded and back-loaded option to the investor's current and future tax rates, time horizon, rate of return, and tax rate on conventional assets.

To examine these issues empirically, we use a panel of tax returns from 1982 and 1995, and develop three main sets of results. First, we show that marginal tax rates fell for most households between 1982 and 1995. This is due to a combination of changes in individual circumstances and changes in tax law. To control for tax law, we impose the 1995 law on the 1982 tax returns. We show that most of the decline in tax rates was due to the change in tax law, not to the net change in individual circumstances.

The second set of results relates to the effective tax rate on IRAs. We define the effective tax rate as the accrual rate of taxation on a non-deductible investment that would yield the same end-of-horizon asset balance as the IRA does. Thus, by definition, the effective tax rate on Roth IRAs is zero. The effective tax rate on a traditional IRA is zero (positive, negative) if the tax rate that applies when the funds are withdrawn is equal to (greater than, smaller than) the tax rate that applied when the deduction was made.

We calculate effective tax rates on traditional IRA contributions that were made in 1982 and withdrawn in 1995 using data on the evolution of tax rates from the panel. We find that for the sample as a whole, the average effective tax rate on traditional IRAs would have been 3 percent. But for those households that actually contributed to IRAs in 1982 and withdrew the funds in 1995, the mean and median effective tax rates would have been about negative 30 percent under actual law. This occurs because the rate at which the withdrawal was taxed in 1995 was significantly lower than the tax rate against which the contribution was deducted in 1982. Even holding tax law constant, the mean and median effective tax rates for these households would have been -13 percent and -10 percent.

The third set of results examines how many and which households in 1982 would have benefited from being to able to invest in a Roth IRA in 1982, relative to investing in a traditional IRA. This calculation trades off the generally negative effective tax rate on traditional IRAs with the smaller amount that can be sheltered in traditional IRAs. We find that under actual law, 44 percent of households would have preferred back-loaded (Roth) IRAs over front-loaded (traditional) IRAs. This is due mainly to the declines in tax rates in 1986. Under constant law, over 70 percent of households would have preferred Roth IRAs.

Our work is related to other recent research that explores optimal portfolio choices for retirement savers. Poterba, Shoven, and Sialm (2000) examine the "asset location" problem: how an investor should allocate safe and risky assets across tax-preferred and fully taxable accounts. Dickson (2000) examines the optimal choice between front- and back-loaded incentives in the presence of uncertainty regarding future tax rates. Gokhale, Kotlikoff, and Neumann (2001) examine the lifetime tax implications of contributing to front-loaded and back-loaded plans.

The paper is organized as follows. Section II summarizes tax rules regarding traditional and Roth IRAs. Section III models investors' choices between back-loaded and front-loaded saving vehicles. Section IV describes the data and our formulation of marginal and effective tax rates. Section V presents our empirical results. Section VI provides concluding comments.

II. IRA Rules[2]

Individual Retirement Accounts were established in 1974 for workers who did not have employer-provided pensions. In the Economic Recovery and Tax Act of 1981, eligibility was extended to all workers and the contribution limits were raised. The Tax Reform Act of 1986 restricted eligibility for deductible contributions. Currently, there are four types of IRAs: deductible, non-deductible, educational, and Roth. We ignore non-deductible and educational IRAs in this paper.

[2] For information on IRA rules, see Commerce Clearing House (2001), Internal Revenue Service (2001), and Joint Committee on Taxation (1999).

A. Traditional IRAs

Eligibility for a deductible IRA depends on income levels and participation in employer-sponsored pensions. In tax year 2000, an individual could deduct up to $2,000 in IRA contributions, provided that neither the individual or his or her spouse were active participants in an employer-sponsored retirement plan. For married couples, deductible contributions up to $2,000 could be made for each spouse as long as the couple's combined compensation equaled or exceeded their contribution. If the individual participated in a retirement plan, the contribution limit was phased out as adjusted gross income (AGI) rose. In 2000, the limit was reduced from $2,000 to zero for singles with AGI between $32,000 and $42,000, and for couples with income between $52,000 and $62,000. For individuals who did not participate in a retirement plan, but whose spouse did, the deductible contribution limit was phased out between $150,000 and $160,000 of AGI.

Withdrawals from deductible IRAs are taxed as ordinary income. Funds withdrawn prior to age 59 ½are subject to an additional 10-percent early withdrawal penalty unless the withdrawal is (a) related to death or disability, (b) made in the form of an annuity, or (c) used to pay for any of the following: medical expenses in excess of 7.5 percent of AGI; health insurance for an unemployed individual; educational expenses for a family member; or first-time homebuyer expenses up to $10,000.

Distributions to an owner of an IRA must begin no later than April 1 following the calendar year in which the owner reaches 70 ½ The period over which distributions must be made—to the owner or a beneficiary if the owner dies—is governed by rules similar to those that apply to qualified employer-sponsored plans.

B. Roth IRAs

Starting in 1998, individuals with AGI below specified thresholds could contribute to a Roth IRA. No Roth IRA contribution is deductible. The contribution limit is the lesser of compensation and $2,000. As of 2000, a taxpayer could not contribute more than $2,000 in total to all IRAs in a given year. Contributions of up to $2,000 could be made for each spouse as long as combined earnings exceeded the combined contributions. The contribution limit is phased out for single taxpayers with AGI between $95,000 and $110,000 and for joint filers with AGI between $150,000 and $160,000.

As with a traditional IRA, Roth IRA balances accrue free of tax. Unlike the traditional IRA, qualified withdrawals from Roth IRAs are not subject to income tax or any penalties. A qualified distribution has two characteristics: (1) the contribution was made at least 5 taxable years prior; and (2) the withdrawal is made when the account holder is at least 59 ½ or because of death or disability, or for first-time homebuyer expenses up to $10,000. As a result of the first provision, no qualified Roth distributions can occur until 2003. Non-qualified distributions from a Roth that are deemed the return of previous contributions are not subject to tax or penalty. Non-qualified distributions that are deemed earnings on contributions are subject to income taxation and can be subject to a penalty. Withdrawals are deemed to represent prior contributions first. Unlike traditional IRAs, Roth IRAs do not require distributions to begin at age 70 ½

C. Conversions and Recharacterizations

Taxpayers with modified AGI of $100,000 or less may convert a deductible or non-

deductible IRA into a Roth IRA and pay taxes on the original IRA as if the entire balance were withdrawn.[3] Under certain conditions, taxpayers can undo a conversion before the due date for the tax return in the year of conversion. Although designed to protect taxpayers from improper conversions—for example, if their income increased unexpectedly—taxpayers might also find this option attractive if the balance in their new Roth IRA fell significantly.

III. Modeling the Choice Between Front-Loaded and Back-Loaded IRAs[4]

For simplicity, let the contribution limit on Roth and deductible IRAs be $1. An investor who would like to save $1 in after-tax income could contribute that amount to a back-loaded IRA. Alternatively, if she could put the dollar in a front-loaded IRA, she would obtain a tax deduction worth t_0, the marginal tax rate applying to IRA contributions. To save the entire dollar, she would then place the tax refund in a taxable saving account.[5] Assume that balances in both IRAs grow at an annual rate of r, the taxable account pays an average annual after-tax return of r´, all of the accounts are cashed out in N years, and the tax rate in year N is t_N. The back-loaded IRA will produce $(1+r)^N$ in retirement assets. The front-loaded IRA is worth the same amount before tax, but is subject to tax at rate t_N, so is worth $(1 + r)^N(1 – t_N)$ after-tax. The investor also

[3] Taxpayers who converted their accounts during 1998 were allowed to pay the tax over four years, which significantly reduced the present value of tax payments and encouraged significant rollovers.

[4] This section builds on prior work in Burman, Cordes, and Ozanne (1990); and Engen, Gale, and Scholz (1994).

[5] The investor could also split the funds between the front- and back-loaded options. In the simple examples studied here, that choice would only be optimal if equation 2 (below) holds with equality, an unlikely event. Dickson (2000) and Gokhale, Kotlikoff, and Neumann (2001) model situations where splitting the funds between the strategies may in fact be optimal.

has a taxable account in this case, worth $t_0(1 + r')^N$. Thus the gain (or loss) from choosing the back-loaded option depends equals Δ , defined as follows:

$$(1) \qquad \Delta = (1 + r)^N - [\,(1 + r)^N (1 - t_N) + (1 + r')^N t_0\,].$$

If Δ is positive, the back-loaded IRA produces more retirement income; if negative, the combination of the front-loaded IRA and the taxable saving account do. These relationships can be summarized in the following expression, which follows from (1) after rearranging terms:

$$(2) \quad \text{If} \quad t_N / t_0 \quad \begin{matrix} > \\ = \\ < \end{matrix} \quad \{(1+r')/(1+r)\}^N \quad \text{then} \quad \begin{matrix} \text{choose back-loaded IRA} \\ \text{indifferent} \\ \text{choose front-loaded IRA.} \end{matrix}$$

The intuition behind this expression is straightforward. The key is that when the actual contribution limits to the front- and back-loaded IRAs are equal—as assumed above and as in the U.S. currently—the back-loaded IRA allows the investor to shelter more funds than the front-loaded IRA does. The reason is that the entire contribution to the back-loaded IRA represents sheltered funds, whereas only $(1 - t_N)$ times the contribution to the front-loaded IRA represents sheltered retirement income. The rest—t_N times the contribution limit—is simply a pre-payment of future taxes. Because the back-loaded IRA shelters more funds, the investor will prefer the back-loaded option if the tax rates are equal in period 0 and N. Equation (2) confirms this fact.

Since the after-tax interest rate, r´, is less than the pre-tax rate r, the right hand side of (2) is always less than 1. Thus, if $t_0 = t_N$, the left side equals 1 and thus exceeds the right side, so that the back-loaded option is preferred.

Comparative statics are easy to derive. Essentially, the back-loaded IRA is more likely to be optimal as (1) the tax rate in retirement (t_N) rises; (2) the current tax rate (t_0) falls; (3) the investment horizon (N) lengthens; and (4) the tax rate on conventional saving ($r - r´$) rises. Each of these conditions merits comments.

First, households who save a lot are more likely to face high tax rates in retirement, since their retirement income will be higher than those who do not save. Thus, one would expect that Roth IRA holders tend to save substantial amounts in other forms, and that is confirmed in surveys (Investment Company Institute 2000).

Second, taxpayers who experience temporarily low tax rates are more likely to prefer Roths to traditional IRAs. These could be families with unusually low income or with unexpectedly large deductions. Alternatively, they could represent younger households, whose current earnings are low but who expect their future earnings to rise significantly. We know of no evidence on these issues currently.

Third, the longer the time horizon, the longer the opportunity for the larger amount of sheltered funds (growing at the tax-free rate r) in the back-loaded IRA to overtake the combination of a smaller amount of sheltered funds and some fully taxable funds growing at the rate r´. Thus, investors who want to hold the IRA as long as possible will be more likely to prefer the Roth relative to those who wish to cash out at age 60.

Fourth, the higher is the tax rate on the taxable saving account, the more likely the Roth

will be the optimal choice. Higher tax rates on taxable accounts reduce the return from the combination of back-loaded IRA and taxable account, but do not affect the return on the Roth. Thus, to the extent that investors are able to invest in alternatives with low effective tax rates, such as tax-exempt bonds or assets that generate returns in the form of unrealized capital gains, the Roth will be a less attractive option.

Finally, an interesting implication of all of these results is that as a household ages—and its current tax rate, investment horizon, and the applicable tax rate on taxable saving accounts change—the household's optimal choices between front- and back-loaded saving options may change as well.

Figure 1 demonstrates a number of these points. For illustrative purposes, the figure assumes that t_0=0.28 and that r′=r(1-0.28). The three lines on the figure represent the break-even tax rates, t_N, for different holding periods, *N*, at three different values for r: 0.05, 0.10, and 0.15. The lines thus represent values for which the taxpayer is indifferent between front-loaded and back-loaded IRAs. The figure shows that back-loaded IRAs become more attractive as N increases and as r increases (because the ratio of r´ to r decreases).

The figure shows that if tax rates are constant over time, investors always prefer the back-loaded option. It also shows that even substantial declines in marginal tax rates in retirement are not sufficient to guarantee that a front-loaded IRA will be preferable to a back-loaded account. For example, If r is 15 percent, a taxpayer who expected her tax rate to fall from 28 percent to 15 percent would still prefer a back-loaded IRA if she expected to wait at least 17 years before making withdrawals. If r is 5 percent, the holding period would have to be much longer—about 47 years.

The underlying assumptions could be altered in several ways with predictable effects. The most significant assumption is that future tax rates are known. If future rates were modeled as uncertain, and if it assumed that the Roth IRA will continue to be untaxed at withdrawal, the effects of tax rate uncertainty are concentrated in the tax rate on the front-loaded IRA and the conventional saving account. Holding the expected tax on those assets constant, an increase in uncertainty will increase the attractiveness of the Roth IRA for risk-averse investors. But it may also cause taxpayers to want to diversify between the front- and back-loaded approaches (see Dickson 2000 and Gokhale, Kotlikoff, and Neumann 2001).

IV. Calculation of Marginal and Effective Tax Rates

The preceding section showed that the optimality of front- versus back-loaded saving options depends on the rate of return, the tax rate on taxable saving, the time horizon for investments, and the evolution of tax rates over time. In the empirical portion of this paper, we develop estimates from panel data on how tax rates evolve over time—and separate that effect into changes due to the life-cycle and changes due to tax law over the period in question. We then combine the data on the evolution of tax rates with plausible assumptions about rates of return and time horizons for investment and examine the optimality of back- versus front-loaded saving options. In this section, we describe the data and methodology for calculating actual and constant-law effective tax rates.

A. Data

To examine the tax rates on IRA contributions and withdrawals, we use data from the

Continuous Work History Survey (CWHS), a randomly sampled panel of individual income tax returns compiled by the Statistics on Income (SOI) division of the Internal Revenue Service.[6] Tax returns were selected based on the last four digits of the primary taxpayer's social security number. Taxpayers are matched across years according to the primary taxpayer's social security number in each year. Age is not reported by the taxpayer, but was attached to the file based on social security records. Matched returns include returns with changes in filing status between 1982 and 1995.

We exclude the returns of individuals claimed as dependents on other returns and returns where the primary taxpayer is younger than 21 or older than 89. Since we are focusing on IRA contributors, we did not adjust the data to account for nonfilers.[7]

There is substantial attrition in the panel. Our data set is based on the 9,100 taxpayers in the CWHS sample in 1981. Since IRAs were not widely available until 1982, we base our analysis on the approximately 8,400 returns with matching social security numbers that could be identified in 1982. Of those, 5,656 were matched in the 1995 sample. Taxpayers leave the panel for several reasons, including: the taxpayer's income falls below the filing threshold in 1995; the taxpayer dies; the taxpayer reports an inaccurate social security number in either 1981, 1982 or 1995; the taxpayer files a late return in 1995; a processing error occurs; for couples that remain married, the taxpayer who is listed first in the 1981 return is listed second in the 1982 or 1995 returns; and a taxpayer's marital status changes so that he or she is no longer the primary

[6] This sample is described in Internal Revenue Service (1997).

[7] See Burman, Gale, and Weiner (1998) or Feenberg, Mitrusi, and Poterba (1997) for a discussion of the importance of nonfilers to the overall distribution of marginal tax rates.

taxpayer.

For the analysis, we use only the 5,656 returns for taxpayers in the sample in both 1982 and 1995. We conjecture that this exclusion will tend to understate the extent to which tax rates fell for households in the sample over the period, since some of the excluded taxpayers would have had income below the filing threshold in 1995, and therefore would have faced a marginal tax rate of zero. However, that exclusion may overstate the extent to which tax rates fell for all taxpayers, since households with temporarily low income in 1982 would be less likely to have filed in 1982, and therefore less likely to have appeared in the sample to begin with.[8]

B. Calculation of Marginal Tax Rates

Calculations of marginal tax rates are always fraught with difficult conceptual and measurement problems concerning the appropriate definition of taxes and income. We do not claim to resolve those issues here. Rather we simply report how we construct our estimates and indicate why we believe the estimates may be useful.

We simulate marginal tax rates by adding $1,000 of adjusted gross income and calculating the change in federal income tax using a simple federal income tax calculator. The estimates account for the tax rate structure, components of income, deductions, and exemptions. The estimates using 1995 law account for the taxation of social security benefits (which would not have affected IRA contributors in 1982), and the phase-outs of itemized deductions and personal exemptions. We do not account for the alternative minimum tax (which affected few taxpayers in

[8] An alternative approach to handling attrition would be to assume that all of the missing returns are due to taxpayers having 1995 incomes that were below the filing threshold. This procedure would assign a marginal tax rate of zero in 1995 to the missing returns, and would overstate the decline in the marginal tax rates.

1995) or the effects of implicit taxes and subsidies created by phase-ins, phase-outs, and tax credits. Burman, Gale, and Weiner (1998a) found that these factors are quantitatively significant, but did not affect the qualitative conclusions about the evolution of tax rates between 1980 and 1995. In addition, we do not include burdens created by federal corporate, estate, payroll or excise taxes, nor any taxes imposed at the state or local level. Nor do we consider any of the implicit taxes created by the income-related phase-outs of government transfer programs, such as welfare or food stamps.

The tax rates apply to adjusted gross income generally. But they would not apply, for example, to capital gains for taxpayers in the top tax brackets, because the tax rate on gains was capped at 28 percent in 1995. Nor do they account for tax-preferred uses or sources of income, or for the direct effect of tax credits because they apply to specific forms of income or expense. Thus, it may be most appropriate to conceive of our marginal tax rate estimates as applying to the direct marginal federal income tax consequences of an additional dollar of taxable interest receipts.

C. Constant Law Tax Rates

Since we would like to focus on changes that individuals might expect in tax rates *ex ante* rather than *ex post*, we also calculate constant law marginal tax rates. That is, we try to match the definition of income in 1982 to the definition used in 1995 and then apply the 1995 tax rules and schedules to the modified 1982 income. Provisions of the tax law that are indexed for inflation, such as tax brackets, personal exemptions, and standard deductions, are indexed to 1982 levels using the CPI for the purpose of calculating 1982 constant law tax rates. The constant law tax

rate estimates do not account for tax credits or implicit taxes.

To calculate 1995-law taxable income in 1982, we made the following adjustments to 1982 income and deductions. We added back the deductions available in 1982, but not 1995, including: untaxed interest and dividends; the adjustment for disability income; the two-earner deduction; untaxed unemployment insurance; the excluded portion of capital gains; and state and local sales taxes. For both the 1982 and 1995 tax calculations, we disallowed both investment and consumer interest deductions. (The 1982 data combines investment interest, which is still deductible, with consumer interest, which is not, so we excluded both.) We added the employee business expense deduction to miscellaneous deductions and subjected them all to the 2% of AGI floor. We subjected medical expenses to the 7.5% of AGI floor. We applied the limit on itemized deductions and the phaseout for personal exemptions, both adjusted for inflation between 1982 and 1995. Finally, we removed capital gains before calculating marginal tax rates in both in 1982 and 1995 because they may be taxed at different rates than other income.

Several adjustments were not possible. The taxation of social security benefits could not be modeled because the data are not available. This is not likely, however, to be a problem for IRA contributors because few receive social security benefits. Similarly, the limits of passive losses and changes in depreciation schedules could not be calculated. Finally, compliance may have been higher in 1995 than in 1982 due to information reporting requirements for sales of assets, interest and dividends, etc., and rules requiring that social security numbers be reported for dependents, but we made no adjustment for compliance differences.

D. Effective Tax Rate on IRA Contributions

A key objective of this paper is to calculate the effective tax rate on IRA contributions. The effective tax rate is the rate of tax on a taxable investment that would produce the same after-tax return over the holding period of the asset as IRA treatment does. Thus, for a Roth IRA, the effective tax rate is always zero. The effective tax rate on a traditional IRA is given by the value of τ that solves the following equation[9]

$$(3) \qquad (1+r(1-\tau))^{13} = (1+r)^{13}\frac{1-\tau_{95}}{1-\tau_{82}}$$

where r is the gross interest rate, τ_{82} is the tax rate that applies to the deductible contribution, τ_{95} is the rate that applies to the taxable withdrawal. For taxpayers who contribute in 1982 and withdraw in 1995, we assume the holding period is 13 years. This is, of course, somewhat arbitrary since both contributions and withdrawals are likely to be made over several years.

V. Results

Table 1 shows the distribution of marginal tax rates for 1982 and 1995 for different groups of taxpayers. In 1982, 56 percent of all tax filers in the panel faced a marginal federal income tax rate between 16 and 31 percent, with about one quarter of taxpayers below 16 percent and one fifth above 31 percent, including 12 percent who faced rates above 36 percent. By 1995, the distribution of marginal tax rates had shifted significantly. About half of all taxpayers in the panel paid a marginal rate of 15 percent, 16 percent paid a marginal tax rate of zero, and only 7 percent faced a marginal rate above 28 percent, with only 3 percent of taxpayers facing rates above 36 percent. The average marginal tax rate (not shown in the table) fell from 22 percent in

[9] See Engen, Gale, and Scholz (1994) for discussion.

1982 to 17 percent in 1995.

The change in the distribution of marginal tax rates is due both to changes in tax law and to changes in the level and composition of taxpayers' income and deductions. The third panel of table 1 shows the tax rates households in 1982 would have faced had they been subjected to 1995 tax law, as described above. Most households in the panel would have faced a marginal rate of 15 percent, with 13 percent in the zero bracket, and 27 percent in the 28 percent bracket. Only 3 percent would have faced marginal rates in excess of 28 percent. The average marginal tax rate would have been 16 percent. Thus, the data suggest that most of the difference between the 1982 and 1995 distributions of tax rates may be attributed to changes in tax law.

The rest of the table provides information on other groups of taxpayers, delineated by whether they contributed to IRAs in 1982 and withdrew from IRAs in 1995.[10] The second and third columns indicate that taxpayers that contributed to IRAs in 1982 were much more likely to face high marginal tax rates in 1982. Just over 3 percent of IRA contributors faced marginal rates of 15 percent or less. About a quarter faced rates between 16 and 28 percent, and more than two-thirds percent faced marginal tax rates of more than 28 percent. In contrast, columns 4 and 5 show that less than a quarter of 1982 non-contributors were in brackets above 28 percent, and almost half faced rates between 16 and 28 percent. Average marginal tax rates (not shown in the table) were about 33 percent for contributors and 20 percent for non-contributors.

[10] The IRA contribution patterns in the data are consistent with previous findings. About 17 percent of taxpayers made contributions in 1982. The proportion rises with income, reaching a plateau at income levels above $50,000, and rises with age, peaking for 55-58 year olds. Average contributions among contributors generally rise with income and are relatively flat with respect to ages above 30.

By 1995, the marginal tax rate differences between 1982 contributors and non-contributors had shrunk somewhat. About 50 percent of contributors faced rates of 15 percent or less, compared to 70 percent of non-contributors. About 15 percent of contributors faced rates above 28 percent, compared to 4 percent of non-contributors. Average marginal tax rates in 1995 (not shown) were about 19 percent for 1982 contributors and 17 percent for non-contributors. The shrinking gap between the tax rates faced by contributors and non-contributors indicates that tax rates fell much more for contributors.

Table 2 reports effective tax rates on traditional IRA contributions that were made in 1982 and withdrawn in 1995. For the group of taxpayers that actually did contribute in 1982 and withdraw funds in 1995, these calculations represent the effective rates they faced under actual or constant law. For other taxpayers, the calculations represent hypothetical effective tax rates they would have faced had they contributed in 1982 and withdrawn the funds in 1995. These calculations use an assumed interest rate of 6 percent.

For the sample as a whole, the mean and median effective tax rate on IRAs would have been about 3 percent and 6 percent, respectively under actual law. Under constant law, those figures would have risen to 13 percent and 17 percent, respectively. However, these figures hide significant variation in effective tax rates among the various sub-groups. Households that had no observed contact with IRAs in 1982 or 1995 would have had by far the highest effective tax rates (column 5). This occurs because their tax rates rise faster than others, in part because they are younger in 1982 and experiencing faster income growth over the sample period.

For groups that either contributed in 1982 or withdrew funds in 1995, effective tax rates on IRAs would have been much lower. Among taxpayers that both contributed in 1982 and

withdrew in 1995 (column 2), the estimated effective tax rate had a mean of negative 29 percent and a median of negative 18 percent. This reflects the fact that marginal tax rates fell significantly for these households, in large part due to the tax reform act of 1986. Even under constant law, though, the effective tax rates are negative and sizable, as shown in the table. Likewise, taxpayers who either contributed in 1982 or withdrew in 1995 (columns 3 and 4), the mean and median effective tax rates on traditional IRAs would have been negative under actual law and very close to zero under constant law.

Although the effective tax rate on Roth IRA is zero, the presence of negative effective tax rates on traditional IRAs does not, in itself, guarantee that households would prefer the traditional IRA, because the sheltering limits differ on the two accounts. To see whether households would have preferred front- or back-loaded IRAs depends on the interactions between the tax rates, the contribution limits and rates of return. Table 3 reports our estimates of the proportion of households who would have benefited from having a Roth IRA rather than a traditional IRA over the 1982-1995 period. Only about 45 percent would have chosen a Roth, with perfect foresight and actual tax law. Although the Roth allows households to shelter more, the decline in tax rates in 1986 would have reduced the value of Roth IRAs relative to traditional IRAs. This is seen by noting that under constant law, the proportion of households that would have preferred Roth IRAs rises to 71 percent. Using actual law, the proportion who would prefer Roth IRAs falls sharply with income. This occurs because marginal tax rates were cut the most at the high end of the income distribution in 1986, and these cuts were only somewhat reversed in 1990 and 1993. The proportion of taxpayers who prefer Roths rises sharply under constant law for upper income taxpayers.

Older taxpayers would have been less likely to have preferred a Roth IRA in 1982, largely because they have higher income than younger taxpayers. Under constant law, the proportion of older taxpayers who would have preferred a Roth IRA rises significantly. On balance, most taxpayers who would be old enough to withdraw from an IRA without penalty in 1995 would have gained from having been able to contribute to a Roth IRA in 1982 instead of a traditional IRA. For example, 76 percent of those aged 50-54 in 1982 (63-67 in 1995) would have benefited from putting their funds in a Roth IRA relative to a traditional IRA, under constant law.

VI. Conclusion

The introduction of Roth IRAs in 1997 and their legislated expansion in 2001 gives households simultaneous access to front-loaded and back-loaded options for retirement saving. In this paper, we address a number of investor choices that arise from this situation. We find that with equal dollar limits on contributions, back-loaded IRAs provide a greater ability to shelter income. Thus, even if tax rates are expected to fall significantly in retirement, taxpayers may still prefer to use back-loaded saving vehicles. We also provide one of the few analyses to date of how tax rates evolve over time, and find that tax rates for most taxpayers fell over the period from 1982 to 1995. This implies that the actual effective tax rates on IRAs over this period were negative. Controlling for tax law, we find that effective tax rates on IRAs were still negative, but smaller in absolute value. Despite the fact that effective tax rates on traditional IRAs were generally negative, many investors would have benefited from contributing to a Roth instead of a traditional IRA over the 1982-95 time period because of the larger effective sheltering provided by a Roth IRA.

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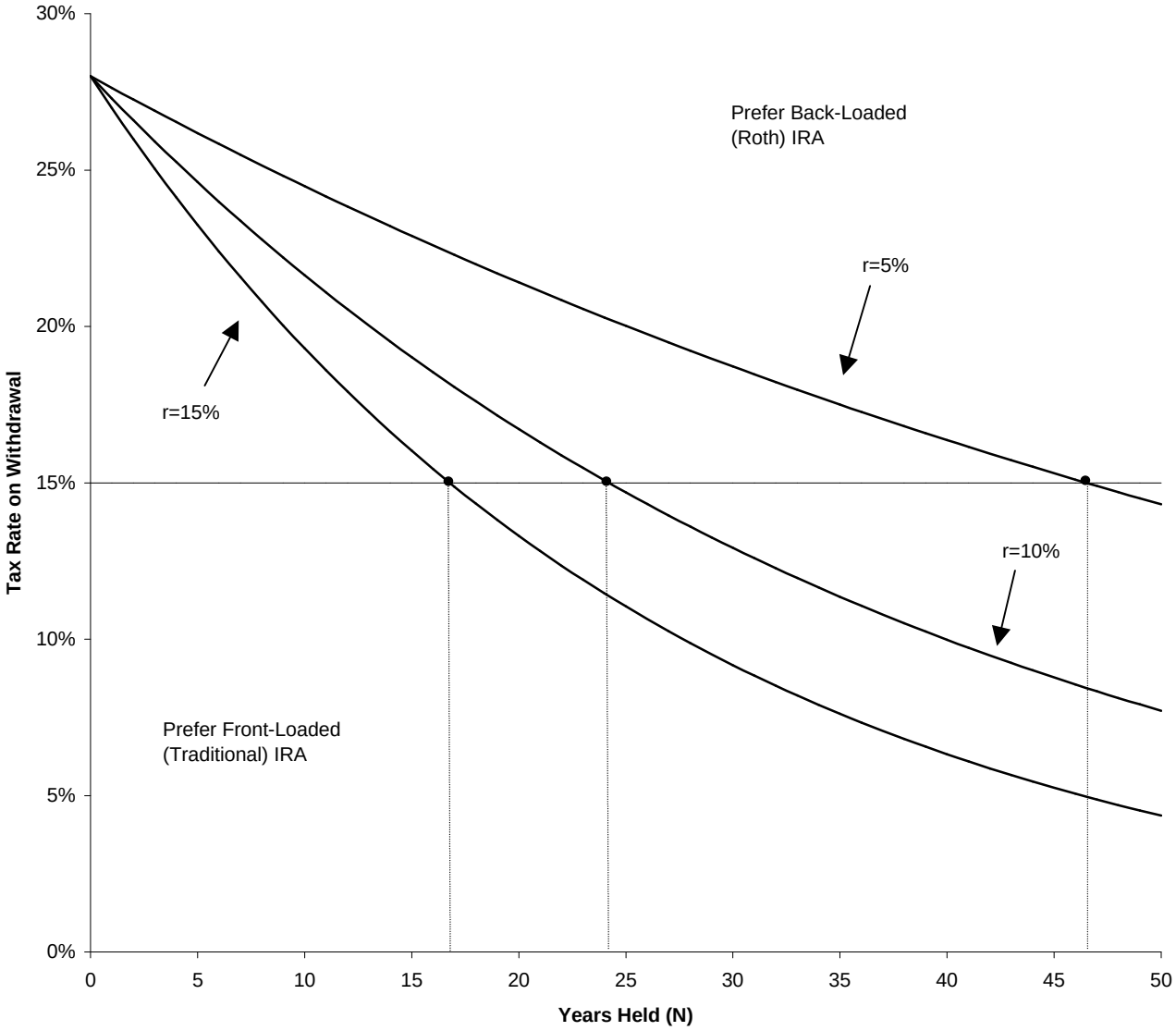
Figure 1. Break-Even Withdrawal Tax Rate



Assumptions: The rate of return on the taxable investment is r' = r(1-0.28).
Tax rate for contributions is t_0 = 28%. A $2,000 contribution is made to each type of IRA.

Table 1

Distribution of Marginal Tax Rates, in Percent (by IRA status, 1982 and 1995)

Contribute in 1982 Withdraw in 1995	ALL ALL	YES YES	YES NO	NO YES	NO NO
1982 MTR					
0	9	1	*	5	11
1-15	16	3	3	13	19
16-28	46	31	24	46	50
29-31	10	14	14	11	9
32-36	7	14	14	10	5
36.1-39.6	6	14	20	7	3
39.7 +	6	24	24	9	3
	100	100	100	100	100
1995 MTR					
0	16	26	15	26	15
1-15	49	36	30	44	53
16-28	29	29	37	26	28
29-31	3	3	9	1	2
32-36	1	1	2	2	*
36.1-39.6	1	3	2	1	1
39.7 +	2	4	4	1	1
	100	100	100	100	100
1982 MTR with 1995 Law					
0	13	-	-	8	16
1-15	57	32	27	52	63
16-28	27	53	61	34	19
29-31	2	8	9	4	1
32-36	*	1	*	*	*
36.1-39.6	1	3	2	1	*
39.7 +	*	3	1	1	*
	100	100	100	100	100

* Less than 0.5 percent

Table 2

Effective Tax Rates on Traditional IRAs
1982-1995*

Contribute in 1982 Withdraw in 1995	ALL ALL	YES YES	YES NO	NO YES	NO NO
Actual Effective Tax Rate (percent)					
Mean	3.3	-29.5	-13.2	-12.5	8.2
Median	5.7	-32.8	-12.4	-10.3	10.4
75th percentile	18.7	-17.1	6.6	5.7	21.9
25th percentile	-13.7	-46.1	-29.8	-34.1	-7.3
Constant-Law Effective Tax Rate (percent)					
Mean	13.4	-12.9	4.5	-1.2	16.7
Median	16.9	-10.6	2.0	0.0	16.9
75th percentile	28.9	0.0	20.2	16.9	34.2
25th percentile	-2.6	-22.7	-10.0	-22.2	0.0

* Estimates assume a 6 percent rate of return, as described in the text.

Table 3

Proportion of Taxpayers for Whom Roth IRA is Optimal (percent)*

	Actual Tax Rates	Constant-Law Tax Rates
All	44.8	71.1
AGI in 1982 ($ thousands)		
<0	69.8	69.8
0-10	72.0	77.6
10-20	41.3	74.5
20-30	33.3	71.1
30-40	40.7	62.5
40-50	29.6	56.2
50-75	19.5	70.2
75-100	21.9	75.0
100-200	26.8	53.7
200+	50.0	66.7
Age in 1995		
25-29	82.1	89.3
30-34	73.6	84.0
35-39	54.2	77.8
40-44	48.9	77.9
45-49	48.9	77.1
50-54	45.2	76.3
55-58	40.1	69.4
59-64	34.5	66.9
65+	23.1	49.2

*Estimates assume a 6 percent rate of return, as described in the text, and a maximum contribution to a Roth or traditional IRA.