Determinants of the Choice between Roth and Deductible IRAs

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ABSTRACT: This study examines tax and nontax determinants of the choice between Roth and deductible Individual Retirement Accounts (IRAs). I find evidence that higher current tax rates relative to average tax rates are positively, but modestly, related to the probability that a taxpayer will contribute to a deductible IRA rather than a Roth IRA. I also find that taxpayers with greater liquidity are more likely to choose a Roth IRA, which is the option with a higher effective contribution limit. The results relate to the question of whether taxpayers behave in a tax-efficient manner and the behavioral response to statutory tax rate changes.

Keywords: Individual Retirement Accounts; taxes.

INTRODUCTION

This study investigates tax and nontax determinants of the choice between Roth and deductible Individual Retirement Accounts (IRAs). Financial planners typically advise individuals to use deductible (Roth) IRAs if their current marginal tax rate is higher (lower) than their expected marginal tax rate at retirement. However, it is very difficult to predict marginal rates far into the future given uncertainty about future income levels and future statutory rates.[1] Consequently, I posit that individuals' choices will reflect a simpler heuristic based on short-term differences in marginal rates, which I measure as the difference between the current year marginal rate (using 1999 data) and the average marginal rate over a three-year period (1998–2000). Potential nontax determinants of this choice that I consider include taxpayer liquidity measures and various demographic factors.

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[1] Burman et al. (2001) found that the average effective tax rate on deductible IRA contributions made in 1982 and withdrawn in 1995 was lower at withdrawal than at contribution. However, if Roth IRAs had been available in 1982, many taxpayers would have benefited from contributing to a Roth IRA instead due to higher effective contribution limits.

Understanding the influence of tax and nontax factors on the choice between Roth and deductible IRAs is important for at least two reasons. First, sensitivity to inter-temporal differences in marginal tax rates would indicate that, on average, taxpayers are both aware of their marginal tax rates and cognizant of their relevance in making this type of investment decision. Such evidence is important because some recent research suggests that individuals make suboptimal investment decisions due to complexity in determining their marginal tax rates (Boylan and Frischmann 2006). Second, the relative importance of tax and nontax factors in the choice of IRA-type relates to the broader question of tax policy's ability to influence economic behavior and the behavioral response to changes in tax rates (Carroll and Hrung 2005). If taxes are found to be important in choosing the type of IRA, then the choice of IRA-type margin should be included in any discussion of dynamic responses to statutory tax rate changes. On the other hand, if nontax factors are the main determinants in the choice of IRA-type, then this margin would not be a large component of any behavioral response.

Prior research finds that taxes are more likely to influence the timing of economic behavior than the level of economic behavior (Auerbach and Slemrod 1997). Much of the previous literature on tax-preferred savings incentives focuses on whether these incentives stimulate additional savings or simply subsidize existing savings (Hubbard and Skinner 1996; Poterba et al. 1996; Engen et al. 1996). Most prior studies of IRA participation (e.g., Hrung 2004) find that marginal tax rates are positively related to the probability of contributing to an IRA, without considering the type of IRA utilized.

Using a unique panel dataset drawn from the Statistics of Income (SOI) Individual Income Tax Files for 1998–2000, I examine a sample of IRA contributors in 1999 who were eligible to make a contribution to both deductible and Roth IRAs.[2] Because Roth IRAs were not available until the 1998 tax year, tax data on Roth IRAs have only recently become available. Thus, very little prior empirical work focuses on Roth IRAs.[3]

I find that the difference between marginal tax rates in 1999 versus adjacent years is positively related to the likelihood of choosing a deductible IRA. This result is consistent with theoretical expectations that the after-tax rate of return is higher for deductible IRAs when the marginal tax rate at contribution exceeds the marginal tax rate at withdrawal. However, the magnitude of this tax rate effect is modest, which suggests that the choice of IRA-type may not be a substantial behavioral response to changes in statutory tax rates. On the other hand, it is important to recognize that the marginal tax rate differences reflected in my data reflect short-term inter-temporal differences in taxable income, which may not fully reflect expectations of differences in marginal tax rates over a longer period.

With respect to nontax determinants, the results suggest that taxpayer liquidity is important in choosing between IRA types. I find that those with more children are more likely to contribute to a deductible IRA, while those with higher disposable income are more likely to contribute to a Roth IRA. I also find that taxpayers with a balance due to the IRS are more likely to choose a Roth IRA. These results suggest that those with more liquidity are more likely to choose the IRA option with the higher effective contribution limit. I also find that those with higher interest and dividend income are less likely to contribute to deductible IRAs. To the extent that higher current investment income proxies for higher expected tax rates at retirement, this result is consistent with theoretical expectations based on inter-temporal differences in marginal tax rates. However, because current

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[2] I do not examine nondeductible IRA contributions because (1) virtually all taxpayers are eligible to make a nondeductible IRA contribution and (2) total nondeductible IRA contributions are very small. For 1999, nondeductible IRA contributions totaled less than $2 billion from fewer than 1 million returns.

[3] Sailer et al. (2003) and Hrung (2004) are two empirical papers that examine Roth IRAs.

investment income also proxies for taxpayer liquidity and the propensity to save, this result could also be interpreted as a nontax determinant of the choice of IRA-type. Finally, I find that older and married taxpayers are more likely to choose a deductible IRA.

The results in this study have added relevance since Roth 401(k) and 403(b) plans became available in 2006. These plans are similar to IRAs; the main difference is that 401(k) and 403(b) plans are available at the employer level, so workers are eligible to participate only if their employers offer these plans.[4] These plans also have higher maximum contribution limits. For those eligible, the decision and federal revenue consequences between deductible and Roth 401(k)s and 403(b)s will be similar to the choice between deductible and Roth IRAs.

BACKGROUND

Deductible IRAs were first introduced in the United States in 1974 as a tax-preferred savings vehicle for those without pensions. Earnings on deductible IRA assets are allowed to accrue tax-deferred. Taxes are levied at the ordinary income rate instead of the capital gains rate when IRA assets are withdrawn at retirement. A penalty in addition to taxes is imposed if assets are withdrawn before age 59.5, and there are rules regarding required distributions from IRAs once the owner reaches age 70.5. Contributions to both types of IRAs for a given tax year can be made up to the April 15 filing date of the following year.

Eligibility restrictions and contribution limits have varied over time. From 1982 to 1986, all working taxpayers up to age 70.5 were eligible to make tax-deductible contributions to an IRA. In those years, a worker could contribute up to $2,000 a year into an IRA, and a worker and a non-working spouse could contribute a combined total of $2,250 (with $2,000 being the limit for each working spouse).

The Tax Reform Act of 1986 restricted eligibility for tax-deductible contributions for high-income taxpayers with employer-provided pensions beginning in the 1987 tax year. However, earnings were still allowed to accrue tax-deferred in all IRA accounts. All workers remained eligible to make a nondeductible contribution to an IRA.[5] IRA participation plummeted from 1986 to 1987 and remained fairly steady thereafter.

Subsequent legislation increased the limit for non-working spouses and provided for non-penalized early withdrawals under certain situations. By 1997, a non-working spouse could contribute up to $2,000 to an IRA. In 1998, eligibility for deductible contributions was expanded substantially for some taxpayers. For married couples where only one spouse is covered by a pension, the income limit above which a deductible contribution is not allowed for the non-covered spouse was increased from $50,000 modified Adjusted Gross Income (AGI) to $160,000 modified AGI. Table 1, Panel A summarizes the eligibility requirements for a deductible IRA contribution in 1999.

The decline in IRA participation after 1986 resulted in efforts to reinvigorate IRAs. In 1998, Roth IRAs were available for the first time.[6] This new type of IRA increased the number of options for tax-advantaged savings. Hrung (2004) calculates that the IRA participation rate increased from 3.3 percent in 1997 to 5.9 percent in 1998.[7] However, Roths

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[4] The 403(b) plans are for those employed at nonprofits.

[5] Nondeductible IRA contributions will not be examined in this study. Here, I draw a distinction between deductible and Roth IRAs. However, to be more accurate, the distinction should be between "Traditional" and Roth IRAs, where contributions to Traditional IRAs may or may not be deductible. A line for contributions to Traditional IRAs that are deductible is on Form 1040. See U.S. Internal Revenue Service Publication 590 for more information on IRAs.

[6] The new type of IRA was named after Senator William Roth of Delaware.

[7] The rate for 1997 is only for deductible IRA contributions, the rate for 1998 is for deductible and Roth IRA contributions.

TABLE 1
Eligibility for Deductible/Roth IRA in 1999:
Modified AGI Level above which a Deductible/Roth IRA Contribution is Not Allowed

	Covered by Pension	Spouse Covered by Pension	Not Covered by Pension (Both Spouses if MFJ)
Panel A: Deductible IRA			
Married Filing Jointly (MFJ)	$61,000	$160,000	No Limit
Single/Head of Household	$41,000	—	No Limit
Panel B: Roth IRA			
Married Filing Jointly (MFJ)	$160,000	$160,000	$160,000
Single/Head of Household	$110,000	—	$110,000

were considered by many to be a budget gimmick, since much of the impact on federal revenues is felt outside of the standard ten-year budget window (Halperin 1998; Burman et al. 2001).

Contributions to a Roth IRA are not deductible, and eligibility is based only on income (conditional on positive earnings). All taxpayers under the income limits are eligible regardless of pension status. As opposed to a deductible IRA, whose earnings are tax-deferred, earnings in a Roth IRA are tax-*free,* since withdrawals are tax-free.[8] A penalty is still imposed for early withdrawal, but contributions can be made beyond age 70.5. The minimum distribution rules that apply to deductible IRAs do not apply to Roth IRAs while the owner is still alive. Table 1, Panel B summarizes the eligibility requirements for a Roth IRA contribution in 1999.[9] Many taxpayers are eligible for both types of IRAs; in fact, any taxpayer without a pension having modified AGI under the limit for Roths would be eligible for both. For the sample period studied, the income limits for deductible IRAs did increase over time, but the income limits for Roth IRAs did not. The Economic Growth and Tax Relief Reconciliation Act of 2001 increased contribution limits for both types of IRAs beginning in 2002, and the Pension Protection Act of 2006 allowed for the indexing of income limits for both types of IRAs starting in 2007.

Original deductible IRA assets can be converted into Roth IRA assets. Taxpayers must have pre-conversion AGI less than $100,000 in the year of the conversion to be eligible for a conversion.[10] Taxes on the converted amount are levied at the ordinary tax rate and are due for the calendar year in which the conversion is made. The early withdrawal penalty is waived for amounts converted into a Roth IRA. Original Roth IRA assets cannot be converted into deductible IRA assets.[11] Under the Tax Increase Prevention and Reconciliation Act of 2005, beginning in 2010, income limits on conversions will be eliminated.[12]

Table 2 presents IRA contribution information for 1999 by AGI class. The first two columns present contribution information for Roth IRAs and the last two columns present

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[8] For withdrawals to be tax-free, the taxpayer must be age 59.5 or older and five years must have passed since the initial Roth contribution.

[9] Note that modified AGI is defined slightly differently for a Roth IRA. Modified AGI for Roths subtracts out any income related to a conversion of deductible or nondeductible IRA assets to a Roth IRA. This type of conversion was first available in 1998.

[10] The $100,000 limit is the same for single and married-filing-jointly taxpayers.

[11] See U.S. Internal Revenue Service Publication 590 for more information on conversions.

[12] As a result, income limits on Roth IRA contributions will effectively be eliminated. A taxpayer could contribute to a nondeductible IRA (which has no income limits), and then convert to a Roth IRA.

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TABLE 2
Distribution of Roth and Deductible IRA Contributions, 1999

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AGI	Roth IRA		Deductible IRA	
	Returns ('000s)	**Amount ($mill)**	**Returns ('000s)**	**Amount ($mill)**
< 0	18	$43	14	$30
$1–$15K	495	$790	284	$450
$15K–$30K	562	$920	733	$1,382
$30K–$40K	499	$874	546	$995
$40K–$50K	484	$962	443	$1,020
$50K–$75K	978	$2,269	724	$1,507
$75K–$100K	852	$2,284	403	$972
$100K–$200K	784	$2,432	414	$1,108
$200K +	38	$96	127	$420
Total	4,710	$10,670	3,688	$7,884
% of IRA returns (Roth or Deductible) eligible for both				73.83%

contribution information for deductible IRAs. Total contributions for these two types of IRAs totaled over $18 billion in 1999 from more than eight million returns. In terms of contribution amounts, Roth IRA contributions are somewhat skewed toward higher-income returns (above $50K in AGI), while deductible IRA contributions are more evenly distributed.[13] I calculate that 74 percent of returns with an IRA contribution were eligible for both types of IRAs.

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THE ROTH/DEDUCTIBLE IRA DECISION

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The difference between a Roth IRA and a deductible IRA can be illustrated with the following formulas:

$$\text{Roth IRA} = (1 + R)^T; \tag{1}$$

$$\text{Deductible IRA} = (1 + R)^T - (1 + R)^T \tau_w + \tau_c (1 + r)^T. \tag{2}$$

These formulas represent the after-tax balance per dollar contributed to a Roth or a deductible IRA at time zero.[14] The tax rate at contribution is represented by τ_c and the tax rate at retirement/withdrawal is represented by τ_w. IRA accounts are assumed to earn an annual rate of return of R and are held to time period T. Equation (1) shows that, at time period T, taxes are not levied on the Roth IRA balance. The first term in Equation (2) for deductible IRAs is the same as in Equation (1). The second term reflects the tax due at time T on the dollar contributed to the deductible IRA. The third term in Equation (2) reflects the value of the tax savings from the dollar contributed to the deductible IRA (τ_c) that is invested in a non-IRA account. This amount is assumed to earn an annual after-tax rate of return of r.[15]

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[13] Since modified AGI for Roth IRAs subtracts out income from conversions, AGI can be higher than modified AGI for Roth contributors. As a result, some taxpayers with AGI greater than $200,000 may still be eligible to contribute to a Roth IRA as shown in Table 2.

[14] This framework is based on Hulse (2003), which in turn is based on Seida and Stern (1998).

[15] If the deduction is consumed instead, r = 0.

Assuming R = r, it is easy to see that the after-tax balances are the same for both types of IRAs if $\tau_c = \tau_w$. The after-tax balance is higher under a Roth IRA when $\tau_c < \tau_w$, and the after-tax balance is higher under a deductible IRA when $\tau_c > \tau_w$. So the advice from financial advisors makes sense from this perspective.

However, as mentioned previously, τ_w may be difficult to estimate. The tax rate at withdrawal will depend on taxable income and tax rates in the future; and even if income at withdrawal is known with certainty, future tax policy and rates are uncertain. The entire rate structure may be higher in the future, in which case, taxpayers could face a higher tax rate at retirement even if their income is lower in the future. Hence, attempts to calculate tax rates at retirement are very speculative and unreliable.

In choosing between deductible and Roth IRAs, taxpayers may focus more on the value of the deduction, regardless of future tax rates. The higher the current tax rate, the higher the value of the deduction in the year the contribution is made. As a result, those facing higher current tax rates may favor deductible IRAs. Or, if relative tax rate comparisons influence the choice of IRA-type, taxpayers facing temporarily high current tax rates may favor deductible IRAs, since a temporarily high current tax rate increases the probability of facing a lower tax rate at retirement. Such behavior would be consistent with optimal savings behavior in general by taxpayers. If taxpayers do not make IRA-type choices in a tax-efficient manner, then it is unlikely that their overall savings decisions will be made in an optimal manner.

If taxes are found to be an important determinant of the IRA choice decision, then this margin would need to be considered when examining how the tax base changes in response to a statutory change in tax rates. For example, if an increase in tax rates leads taxpayers to switch from Roth IRAs to deductible IRAs, then their tax liabilities could actually decrease despite the higher tax rates. If nontax factors are relatively more important in the choice of IRA-type, then this margin will not be a large component of any behavioral response to statutory tax rate changes.

Some considerations will lead taxpayers to prefer deductible IRAs. For example, taxpayers may suspect that the government will someday renege on the promise not to tax withdrawals from Roth IRAs. If so, deductible IRAs may be preferred because they secure the tax benefits up front with certainty. A contribution to a deductible IRA also retains the possibility of converting the account to Roth status at a later date (Hulse 2003).

On the other hand, Roth IRAs possess attributes that may make them preferable to deductible IRAs. First, since Roth contributions are made with post-tax dollars and the statutory contribution limits for both types of IRAs are the same, effective contribution limits are higher for Roths, and more income can receive tax-preferred treatment under a Roth IRA. Therefore, taxpayers with more liquidity (for example, those with fewer children or higher-income taxpayers) will be more able to take advantage of the higher effective contribution limits under Roth IRAs. Another way to illustrate the higher effective contribution limit under Roths is to note that, at withdrawal, a dollar contributed to a Roth IRA will result in a higher IRA balance than a dollar contributed to a deductible IRA (i.e., the sum of the first two terms in Equation (2) is less than the expression in Equation (1) if $\tau_w > 0$).[16] Second, taxpayers have more access to Roth assets in the sense that contributions (but not earnings) to Roths can be withdrawn tax-free and penalty-free. In addition, there are no required minimum distributions from Roths when the taxpayer reaches age 70.5.

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[16] The third term in Equation (2) represents non-IRA balances.

DATA

The data for this study come from a panel of taxpayers randomly selected from the Statistics of Income (SOI) Individual Income Tax Files for 1998–2000; I refer to the 1999 tax year as the ''current'' tax year. I select all returns with the same five sets of four ending-digits of the Social Security number for the primary taxpayer. These randomly drawn returns from the SOI files are commonly referred to as the Continuous Work History Survey. The dataset studied here has advantages over public-use tax data in that the age of the taxpayers and their participation in an employer-sponsored retirement plan are available. I am therefore able to determine which IRA returns were eligible for both Roth and deductible IRA contributions in 1999.

Another advantage of the data studied here is that information on Roth contributions at the individual level is included. While information on deductible IRA contributions is available on Form 1040, Roth IRA contributions are contained on Form 5498 and are not provided in public-use tax data.[17] Form 5498 is filed by financial institutions, not individual taxpayers. For this study, the information on Form 5498 must be linked with tax forms filed by taxpayers. As I am interested in the choice between Roth and deductible IRAs, I focus on returns with an IRA contribution in 1999 that were eligible to make a contribution to both (see Table 1 for the eligibility rules).[18] Otherwise, the data examined here are identical to public-use tax data.

I further restrict the sample to taxpayers between the ages of 21–69, those with earnings, and those filing as single, married, or head of household. Because I use taxpayer data across time to calculate average income, I restrict the sample to those who did not change marital status from 1998 to 2000. The earnings criterion is necessary since IRA contributions are possible only for those with earnings, and the age criterion is a natural restriction since contributions to deductible IRAs are not allowed after age 70.

The U.S. Treasury's Individual Tax Simulation Model is used to calculate the marginal tax rates in this study. These marginal tax rates will reflect effective marginal tax rates instead of statutory tax rates. Marginal tax rates are simulated first by adding $100 to AGI under the respective scenarios detailed below. The difference in tax liability due to this extra $100 is divided by 100 to arrive at the effective marginal tax rate. Because of various deductions, exemptions, and credits, along with their respective phase-ins and phase-outs, the effective marginal rate for a given taxpayer may differ from the statutory tax rate.[19] The marginal tax rate calculations do not include state and local tax rates. Cilke (1994) contains details regarding the Treasury's tax calculator.

Other explanatory variables such as marital status, disposable income, and number of children will also be examined. Disposable income is defined as total income (as noted on Form 1040) minus income taxes assuming no deductible IRA contribution. Since disposable income can take on negative values, category dummy variables will be used instead of taking the log of disposable income. Taxpayers with disposable income of less than $15,000 are the reference group in the regressions.[20]

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[17] Form 5498 also contains information on nondeductible contributions to Traditional IRAs. This information is not found on Form 1040.

[18] I include taxpayers who may be partially phased out for either IRA. Deleting these returns did not change the results in any significant way.

[19] As a result, even current marginal tax rates may be difficult for the taxpayer to calculate.

[20] Deleting observations with negative disposable income (for example, negative income due to business losses), as well as using other income definitions such as AGI or total income, did not change the results in any significant way.

Because deductible IRA contributions can potentially lower a taxpayer's marginal rate, I focus on the taxpayer's first-dollar marginal rate. This is the marginal tax rate for the taxpayer prior to any deductible IRA contribution:

$$\tau_{fd} = \tau(AGI_{1999} \text{ plus IRA Deduction}_{1999}).$$

For the relative rate comparison, this first dollar marginal rate will be compared to an average tax rate based on average income. I first calculate average real (1999 dollars) taxable income from 1998 to 2000. I then use this value for taxable income in the 1999 tax calculator to arrive at an average tax rate:

$$\tau_{afd} = \tau(\text{Average Real pre-IRA Deduction Taxable Income}_{1998-2000}).$$

Because tax year 2000 income may not be in the taxpayer's information set, I also examine the difference in first-dollar marginal rates from 1998 to 1999.[21] I expect that current tax rates will be positively related to the probability of choosing a deductible IRA over a Roth IRA and that differences in marginal tax rates between years will also be positively related to the probability of contributing to a deductible IRA over a Roth IRA.

Ideally, I would be able to compare current tax rates against expected future tax rates during retirement years. Unfortunately, direct information about expected future tax rates is not available in tax data, so I include interest and dividend income as rough proxies for higher tax rates at retirement.[22] Taxpayers with capital income will likely face higher rates in retirement than those without capital income, so taxpayers with more capital income may be less likely to choose a deductible IRA.[23] However, interest and dividend income also proxies for taxpayer liquidity.

A dummy variable for fair market value of end-of-1998 IRA assets greater than $100,000 helps proxy for higher tax rates at retirement since these assets will be taxed upon withdrawal.[24] However, this variable should be treated with caution since it will understate the number of taxpayers with substantial assets in tax-preferred savings accounts. A taxpayer who has not contributed to an IRA, but who has accumulated more than $100,000 in a 401(k)/403(b) plan, will have a value of zero for this variable; an otherwise identical taxpayer who has rolled over 401(k)/403(b) assets into an IRA will take on a value of 1 for this variable.

The other independent variables may be related to the choice between deductible and Roth IRAs. For example, as mentioned above, those with fewer children and higher disposable income have more liquidity and will therefore be more able to take advantage of the higher effective contribution limits of Roth IRAs. Because it lowers AGI, a deductible IRA contribution will likely increase itemized deductions, as the likelihood of deducting items that have a minimum threshold based on AGI will be increased. For example, medical

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[21] IRA contributions for a given tax year can be made up to April 15 of the following calendar year so there may be some information regarding year 2000 income available to the taxpayer if a 1999 IRA contribution is made in 2000. It is not possible to determine from the data when an IRA contribution for a given tax year is made.

[22] Interest income includes taxable and tax-exempt interest income.

[23] As higher capital income also suggests higher levels of non-IRA wealth, taxpayers with more capital income may be more likely to contribute to a Roth IRA given the lack of minimum distribution rules and the resulting estate-planning advantages.

[24] Information on fair market value is found on Form 5498. I subtract out any conversions of deductible IRA assets into Roth IRA assets from fair market value since Roth assets will not be taxed upon withdrawal. Taxes are paid on the conversion as if it were withdrawn. Taxes on conversions in 1998 were allowed to be paid over four years.

and dental expenses are deductible only to the extent that they exceed 7.5 percent of AGI.[25] Therefore, itemizers may be more likely to choose a deductible IRA over a Roth IRA.

A dummy variable for paid preparer usage is also included, as previous studies have found that paid preparers influence IRA participation (Frischmann et al. 1998; Hrung 2001, 2004). Similarly, paid preparers may influence the choice between a deductible and a Roth IRA.

Based on sample periods prior to the introduction of Roth IRAs, several prior studies find that taxpayers with a balance due to the IRS (prior to any deductible IRA contribution) are more likely to contribute to a deductible IRA (Feenberg and Skinner 1989; Frischmann et al. 1998; Eaton 2002). An explanation for this finding is that taxpayers with a balance due would rather contribute to a deductible IRA than write a check to the IRS. A similar phenomenon may occur in the choice between a deductible and a Roth IRA. Taxpayers with a balance due may be more likely to contribute to a deductible IRA as they seek to reduce their tax liability for a given year.

Summary statistics for the sample of taxpayers eligible to contribute to both types of IRAs are presented in Table 3, Panel A, and the summary statistics for the subsample of IRA contributors are presented in Panel B. The IRA participation rate for those eligible to contribute to both types of IRAs is 8.1 percent. Of these participants, 53.9 percent chose a deductible IRA.[26] A few notable differences between the two panels are that IRA contributors: (1) are older on average; (2) have higher tax rates and average disposable income; and (3) are more likely to be married than the more general sample of eligible taxpayers. IRA contributors in 1999 are also more likely to itemize their returns and to receive interest and dividend income. This finding is consistent with IRA contributors having a higher preference for savings and being more likely to have other forms of savings than are non-contributors.

As a preview for the regression results, Table 4 presents means of variables for the sample of IRA contributors split into deductible and Roth contributors. The mean difference between current and average tax rates is larger in magnitude for deductible IRA contributors, as is the mean difference between 1999 and 1998 tax rates. Deductible IRA contributors tend to be older, more likely to be married, and have fewer children on average. While deductible IRA contributors are just as likely to have interest income as Roth IRA contributors, they are much less likely to have dividend income.

PROBIT WITH SAMPLE SELECTION

Simple probit results will be subject to sample selection bias since taxpayers must first decide whether to contribute to an IRA before deciding to contribute to a Roth or a deductible IRA. As shown in Table 3, the subsample of IRA contributors differs along a number of margins from the more general sample of taxpayers (IRA contributors and non-contributors) eligible to contribute to both types of IRAs. With respect to the tax measures, probit results may be biased upward if IRA contributors are more responsive to taxes than are non-contributors, which may be the case if a high preference for savings is associated with a greater responsiveness to taxes. Therefore, I present results from a probit model with sample selection following the method in Van de Ven and Van Praag (1981).

The decision to contribute to an IRA will involve the larger sample of taxpayers eligible to contribute to either type (Table 3, Panel A). The additional variable for this decision, which is excluded in the Roth/deductible IRA decision for identification, is a dummy

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[25] On the other hand, a lower tax rate due to lower AGI will reduce the value of any existing deductions.
[26] There were no cases in the sample where spouses on a joint return each contributed to a different type of IRA.

TABLE 3
Summary Statistics

Panel A: Taxpayers Eligible to Contribute to Both Deductible and Roth IRAs

	Mean	Std. Dev.
$1(\text{IRA Contribution}_{99} > 0)$	0.081	0.273
First Dollar Tax Rate in 1999 (τ_{fd})	0.170	0.090
First Dollar Tax Rate at Average Real Taxable Income (τ_{afd})	0.164	0.090
($\tau_{fd}-\tau_{afd}$)	0.0061	0.074
First Dollar Tax Rate in 1998 (τ_{1998})	0.167	0.091
($\tau_{fd}-\tau_{1998}$)	0.003	0.086
Age	39.55	12.65
Disposable Income	$32,671	$34,694
1(Married)	0.472	0.499
# Children	0.798	1.080
1(Itemizer)	0.317	0.465
1(Interest Income > 0)	0.504	0.500
Interest Income	$562	$3,935
1(Dividend Income > 0)	0.195	0.396
Dividend Income	$294	$2,257
$1(\text{Fair Market Value}_{98} > \$100K)$	0.026	0.159
1(Paid Preparer)	0.554	0.497
1(Owe $ to IRS)	0.187	0.390
1(No Pension Coverage)	0.482	0.500
Obs = 28,945		

Panel B: IRA Contributors Only

	Mean	Std. Dev.
$1(\text{Deductible IRA Contribution}_{99})$	0.539	0.499
First Dollar Tax Rate in 1999 (τ_{fd})	0.210	0.084
First Dollar Tax Rate at Average Real Taxable Income (τ_{afd})	0.206	0.085
($\tau_{fd}-\tau_{afd}$)	0.0040	0.063
First Dollar Tax Rate in 1998 (τ_{1998})	0.200	0.084
($\tau_{fd}-\tau_{1998}$)	0.010	0.076
Age	43.68	12.45
Disposable Income	$46,929	$35,927
1(Married)	0.619	0.486
# Children	0.649	1.003
1(Itemizer)	0.505	0.500
1(Interest Income > 0)	0.864	0.343
Interest Income	$1,756	$4,738
1(Dividend Income > 0)	0.551	0.497
Dividend Income	$1,101	$3,421
$1(\text{Fair Market Value}_{98} > \$100K)$	0.091	0.288
1(Paid Preparer)	0.585	0.493
1(Owe $ to IRS)	0.393	0.488
Deductible IRA Contribution	$1,154	$1,368
Roth IRA Contribution	$1,107	$1,747
Obs = 2,347		

TABLE 4
Summary Statistics

| | IRA Contributors | | | |
| | Deductible | | Roth | |
	Mean	Std. Dev.	Mean	Std. Dev.
First Dollar Tax Rate in 1999 (τ_{fd})	0.212	0.084	0.207	0.085
First Dollar Tax Rate at Average Real Taxable Income (τ_{afd})	0.203	0.080	0.209	0.085
($\tau_{fd}-\tau_{afd}$)	0.0089	0.062	−0.0017	0.064
First Dollar Tax Rate in 1998 (τ_{1998})	0.198	0.083	0.202	0.085
($\tau_{fd}-\tau_{1998}$)	0.014	0.080	0.006	0.071
Age	47.60	12.049	37.11	11.926
Disposable Income	$45,846	$39,054	$48,214	$31,833
1(Married)	0.656	0.475	0.575	0.495
# Children	0.588	0.950	0.721	1.052
1(Itemizer)	0.503	0.500	0.508	0.500
1(Interest Income > 0)	0.876	0.330	0.849	0.358
Interest Income	$2,035	$5,073	$1,428	$4,288
1(Dividend Income > 0)	0.509	0.500	0.601	0.490
Dividend Income	$1,075	$3,461	$1,131	$3,373
1(Fair Market Value$_{98}$ > $100K)	0.100	0.300	0.081	0.273
1(Paid Preparer)	0.596	0.491	0.572	0.495
1(Owe $ to IRS)	0.444	0.497	0.333	0.471
Obs.	1,265		1,082	

variable for the lack of pension coverage. Since those covered by a pension at work will have at least some form of income in retirement, I expect that taxpayers lacking pension coverage are more likely to contribute to an IRA.

More formally, the initial IRA participation decision is as follows:

IRA Contribution$_{99}$ = 1   if γ_1(Tax Measure) + γ_2Z + u_2 > 0

IRA Contribution$_{99}$ = 0   otherwise.

The Roth/deductible IRA decision for IRA contributors is as follows:

Deductible IRA Contribution$_{99}$ = 1   if β_1(Tax Measure) + β_2X + u_1 > 0

Deductible IRA Contribution$_{99}$ = 0   otherwise

where:

$u_1 \sim N(0,1)$, $u_2 \sim N(0,1)$, and corr(u_1, u_2) = ρ.

In some specifications, Tax Measure is only the current tax rate. In other specifications, Tax Measure includes both the current tax rate and a tax difference measure. The other explanatory variables are included in X. For identification, Z includes the variables in X, plus the dummy variable for no pension coverage. Uncorrected probit results for the Roth /deductible IRA decision will be biased if $\rho \neq 0$.

Table 5 presents probit results for the IRA participation decision for taxpayers eligible to contribute to both types of IRAs. Although the IRA participation decision is not the focus of this study, a few of the results in the table are worth noting. The coefficient on the dummy variable for lack of pension coverage is positive and statistically significant. Also of note is that the coefficient on τ_{fd} is positive and significant. This result is consistent

TABLE 5
IRA Participation Probit Results—Marginal Effect Presented
(absolute value t-statistics in parentheses)

	(1)	(2)	(3)
First Dollar Tax Rate in 1999 (τ_{fd})	0.081*	0.107*	0.079*
	(4.17)	(4.62)	(3.43)
First Dollar Tax Rate in 1999 minus First Dollar Tax Rate at Average Real Taxable Income ($\tau_{fd}-\tau_{afd}$)	—	−0.048**	—
	—	(2.22)	—
First Dollar Tax Rate in 1999 minus First Dollar Tax Rate in 1998 ($\tau_{fd}-\tau_{1998}$)	—	—	0.003
	—	—	(0.18)
Log(100 + Interest Income)	0.024*	0.024*	0.024*
	(19.22)	(19.14)	(19.21)
Log(100 + Dividend Income)	0.021*	0.021*	0.021*
	(14.82)	(14.73)	(14.81)
1(Preparer)	−0.008*	−0.008*	−0.008*
	(2.91)	(2.85)	(2.92)
Age/10	0.043*	0.043*	0.044*
	(5.33)	(5.32)	(5.34)
(Age/10)^2	−0.006*	−0.006*	−0.006*
	(6.26)	(6.26)	(6.27)
1(Married)	0.002	0.002	0.002
	(0.41)	(0.53)	(0.40)
# Children	−0.012*	−0.012*	−0.012*
	(7.84)	(7.43)	(7.85)
Disposable Income ($15K–$25K)	0.015*	0.014*	0.015*
	(2.80)	(2.68)	(2.80)
Disposable Income ($25K–$50K)	0.042*	0.040*	0.042*
	(7.65)	(7.22)	(7.56)
Disposable Income ($50K–$75K)	0.043*	0.039*	0.043*
	(5.76)	(5.17)	(5.68)
Disposable Income ($75K+)	0.046*	0.041*	0.046*
	(5.05)	(4.40)	(4.96)
1(Itemizer)	0.013*	0.013*	0.013*
	(3.82)	(3.80)	(3.83)
1(Fair Market Value$_{98}$ > $100K)	0.007	0.007	0.007
	(0.99)	(0.98)	(1.00)
1(Owe $ to IRS)	0.034*	0.034*	0.034*
	(10.35)	(10.43)	(10.32)
1(No Pension Coverage)	0.019*	0.019*	0.019*
	(7.08)	(7.13)	(7.12)

Obs. = 28,945
Mean of Dependent Variable = .081

*, ** Denotes significance at the 1 percent and 5 percent levels, respectively, using a two-tailed test.
Dependent variable: 1(IRA Contribution$_{99}$ > 0)

with previous studies and suggests that τ_{fd} is a valid marginal tax rate measure. The coefficient on the tax rate difference in column (2) is negative and significant, but positive and insignificant in column (3).

In this first-stage regression, those with more interest and dividend income are more likely to contribute to an IRA. The coefficients for groups with disposable income above $25,000 are positive, significant, and of roughly the same magnitude. Those with more children are less likely to contribute to an IRA. These results are consistent with more liquid taxpayers being more likely to contribute to an IRA. The coefficient on the dummy variable for a balance due to the IRS is positive, highly significant, and consistent with results from previous studies. The coefficient on the preparer variable is significant and negative; however, its magnitude is small.

Table 6 presents probit results for the Roth/deductible IRA decision corrected for sample selection bias. The null hypothesis of independence between the two decisions ($\rho = 0$) can be rejected at the 99 percent confidence level for all the specifications.[27] For the explicit tax measures, the current tax rate is not significant in any specification. The coefficients for the tax rate differences are both positive and significant, at least at the 90 percent confidence level. This result suggests that taxpayers take taxes into account, in a way consistent with theoretical predictions, when choosing between Roth and deductible IRA types.

The coefficients on the capital income measures both have the expected negative sign. To the extent these variables proxy for higher tax rates in retirement, this result is consistent with the expectation that those more likely to face higher tax rates in retirement will prefer Roth IRAs. However, these variables may also proxy for greater liquidity, so this result is also consistent with a liquidity interpretation in that taxpayers with more liquidity are better able to take advantage of the higher effective contribution limits of Roth IRAs. Also, those with more capital income should prefer Roths for their estate-planning advantages.

To gain a sense of the magnitude of the tax rate results, consider a taxpayer who faces a current first-dollar tax rate of 26 percent and an average rate equal to 20 percent.[28] Compare this taxpayer to one who faces a current and average rate equal to 20 percent. Applying the results in Table 6, column (2), the first taxpayer would be only 1.9 percentage points more likely to contribute to a deductible IRA.[29] As the results suggest that tax rates have only a modest influence on the choice of IRA-type, the behavioral response on this margin to tax rate changes is not large.

The results for the other variables suggest that tax policy can influence the choice of IRA-type, aside from the direct tax measures. The coefficient for the number of children is positive and significant in all specifications. The disposable income coefficients in Table 6 become more negative with higher income. The coefficients for the top two income groups are negative and significant. These results are consistent with taxpayers with more liquidity being more likely to choose a Roth IRA because they are better able to take advantage of the higher effective contribution limits under Roths.

For the other determinants, the linear age coefficient is insignificant, but the age-squared coefficient is positive and significant. Since Roth IRAs were fairly new in 1999, older

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[27] The estimated ρ is negative in all the specifications. Comparing the sample selection Tax Measure coefficients with the uncorrected (unreported) coefficients shows that the uncorrected coefficients are biased upward, perhaps due to IRA contributors being more sensitive to tax rate differences than non-contributors.

[28] The summary statistics in the bottom of Table 3 show that mean first dollar tax rates are around 20 percent. The standard deviation of the first tax difference measure is 6.3 percent, so I use 26 percent versus 20 percent in this comparison.

[29] $\{[.26 * (-.076)] + [(.26 - .20) * .393]\} - [.20 * (-.076)] = .019$.

TABLE 6
Probit Regression Results Corrected for Sample Selection—Marginal Effects Presented
(absolute value t-statistics in parentheses)

	(1)	(2)	(3)
First Dollar Tax Rate in 1999 (τ_{fd})	0.108	−0.076	−0.024
	(0.82)	(0.51)	(0.16)
First Dollar Tax Rate in 1999 minus First Dollar Tax Rate at Average Real Taxable Income ($\tau_{fd}-\tau_{afd}$)	—	0.393*	—
	—	(2.90)	—
First Dollar Tax Rate in 1999 minus First Dollar Tax Rate in 1998 ($\tau_{fd}-\tau_{1998}$)	—	—	0.216
	—	—	(1.87)
Log(100 + Interest Income)	−0.047*	−0.047*	−0.047*
	(6.57)	(6.51)	(6.60)
Log(100 + Dividend Income)	−0.078*	−0.077*	−0.078*
	(12.09)	(11.90)	(12.07)
1(Preparer)	0.0001	0.0001	0.0001
	(0.01)	(0.01)	(0.01)
Age/10	−0.017	−0.013	−0.013
	(0.33)	(0.26)	(0.26)
$(Age/10)^2$	0.015*	0.015*	0.015*
	(2.69)	(2.64)	(2.65)
1(Married)	0.046**	0.042	0.044**
	(2.08)	(1.89)	(1.98)
# Children	0.032*	0.030*	0.031*
	(3.52)	(3.22)	(3.37)
Disposable Income ($15K–$25K)	0.032	0.036	0.034
	(0.98)	(1.11)	(1.06)
Disposable Income ($25K–$50K)	−0.063	−0.053	−0.057
	(1.83)	(1.51)	(1.65)
Disposable Income ($50K–$75K)	−0.163*	−0.141*	−0.152*
	(3.72)	(3.14)	(3.43)
Disposable Income ($75K+)	−0.243*	−0.210*	−0.224*
	(4.70)	(3.95)	(4.25)
1(Itemizer)	−0.032	−0.032	−0.030
	(1.73)	(1.71)	(1.63)
1(Fair Market Value$_{98}$ > $100K)	−0.048	−0.049	−0.047
	(1.52)	(1.53)	(1.47)
1(Owe $ to IRS)	−0.036	−0.038**	−0.040**
	(1.82)	(1.96)	(2.08)

IRA contributors = 2,347
Mean of Dependent Variable = .539

*, ** Denotes significance at the 1 percent and 5 percent levels, respectively, using a two-tailed test.
Dependent variable: 1(Deductible IRA Contribution$_{99}$)

taxpayers may have been more likely to continue investing in deductible IRAs instead of investigating Roth IRAs.[30] Also, deductible IRAs are not subject to a five-year requirement as are Roth IRAs, and this would affect older contributors more than younger contributors. The coefficient for married taxpayers is positive and significant at the 95 percent confidence

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[30] I thank an anonymous referee for this suggestion.

level in most of the specifications. The coefficient for itemizers is not significantly different from zero.

Finally, the coefficient on the dummy variable for a balance due to the IRS is negative. This suggests that those with a balance due to the IRS prefer to contribute to a Roth IRA over a deductible IRA. The magnitude for this coefficient is consistent across the specifications, and the coefficient is statistically significant at the 95 percent confidence level in Table 6, columns (2) and (3). It was expected that a taxpayer with a balance due would be more likely to contribute to a deductible IRA to reduce tax liability for a given year. One possible explanation for the result in Table 6 is that higher income taxpayers are more likely to have a balance due to the IRS and are more able to take advantage of the higher effective contribution limit for Roth IRAs. In the sample, 52 percent of IRA contributors with disposable income greater than $75,000 had a balance due to the IRS. For IRA contributors with disposable income less than $15,000, this percentage was 36 percent.

CONCLUSION

Taxpayers are often told to compare their current tax rate to their expected tax rate at retirement when deciding between a Roth and a deductible IRA. However, tax rates at retirement are difficult for the researcher, as well as the taxpayer, to calculate. I examine more directly observable tax measures along with other factors and investigate their relationship to the choice between Roth and deductible IRAs. The results have implications for the optimality of IRA choice decisions and possibly savings behavior in general, as well as the behavioral response to changes in tax rates.

I examine a sample of IRA contributors in 1999 who were eligible to make a contribution to both types of IRAs. Taking into account sample selection due to the voluntary nature of IRA contributions, I find some modest evidence that higher current marginal tax rates, relative to marginal tax rates in adjacent years, are positively related to the probability of contributing to a deductible IRA. Although this evidence suggests that marginal tax rates affect the choice of IRA-type in a manner consistent with theoretical expectations, the small magnitude of this effect indicates that the choice of IRA-type margin is unlikely to be a large component of any behavioral response to statutory tax rate changes.

My results indicate that a number of nontax factors affect the choice of IRA-type. In particular, several factors that proxy for taxpayer liquidity are positively related to the probability of choosing a Roth IRA. Although Roth IRAs do not provide an immediate tax savings in the year of contribution, they do have higher effective contribution limits than deductible IRAs and, therefore, are likely to be preferred by taxpayers with greater wherewithal to save.

REFERENCES

Auerbach, A., and J. Slemrod. 1997. The economic effects of the Tax Reform Act of 1986. *Journal of Economic Literature* 35 (2): 589–632.

Boylan, S., and P. Frischmann. 2006. Experimental evidence on the role of tax complexity in investment decisions. *The Journal of the American Taxation Association* 28 (2): 69–88.

Burman, L., W. Gale, and D. Weiner. 2001. The taxation of retirement saving: Choosing between front-loaded and back-loaded options. *National Tax Journal* 54 (3): 689–702.

Carroll, R., and W. Hrung. 2005. What does the taxable income elasticity say about dynamic responses to tax changes? *American Economic Review, Papers and Proceedings* 95 (2): 426–431.

Cilke, J. 1994. *The Treasury Individual Income Tax Simulation Model*. Department of the Treasury, Office of Tax Analysis. Washington, D.C.: Government Printing Office.

Eaton, D. 2002. The impact of the source of changes in marginal tax rates on participation in individual retirement accounts. *The Journal of the American Taxation Association* 24 (1): 46–59.

Engen, E., W. Gale, and J. K. Scholz. 1996. The illusory effects of saving incentives on saving. *Journal of Economic Perspectives* 10 (4): 113–138.

Feenberg, D., and J. Skinner. 1989. Sources of IRA saving. In *Tax Policy and the Economy*, Vol. 3, edited by L. Summers. Cambridge, MA: MIT Press.

Frischmann, P., S. Gupta, and G. Weber. 1998. New evidence on participation in individual retirement accounts. *The Journal of the American Taxation Association* 20 (2): 57–82.

Halperin, D. 1998. I want a Roth IRA for Xmas. *Tax Notes* 81: 1567–1570.

Hrung, W. 2001. Information and IRA participation: The influence of tax preparers. *Journal of Public Economics* 80 (3): 467–484

———. 2004. Information, the introduction of Roths, and IRA participation. *Contributions to Economic Analysis & Policy* 3 (1).

Hubbard, R. G., and J. Skinner. 1996. Assessing the effectiveness of saving incentives. *Journal of Economic Perspectives* 10 (4): 73–90.

Hulse, D. 2003. Embedded options and tax decisions: A reconsideration of the traditional vs. Roth IRA decision. *The Journal of the American Taxation Association* 25 (1): 39–52.

Poterba, J., S. Venti, and D. Wise. 1996. How retirement saving programs increase saving. *Journal of Economic Perspectives* 10 (4): 91–112.

Sailer, P., M. Weber, and K. Gurka. 2003. Are taxpayers increasing the buildup of retirement assets? Preliminary results from a matched file of tax year 1999 tax returns and information returns. In *Special Studies in Federal Tax Statistics: 2002*, edited by J. Dalton, and B. Kilss. Washington, D.C.: Internal Revenue Service.

Seida, J., and J. Stern. 1998. Extending Scholes/Wolfson for post-1997 pension investments: Application to the Roth IRA contribution and rollover decisions. *The Journal of the American Taxation Association* 20 (2): 100–110.

Van de Ven, W., and B. Van Praag. 1981. The demand for deductibles in private health insurance: A probit model with sample selection. *Journal of Econometrics* 17 (2): 229–252.