

The Effect of Recent Tax Changes on Tax-Deferred Saving Behavior

Bradley T. Heim *

Office of Tax Analysis
U.S. Department of the Treasury

October 2008

PRELIMINARY AND INCOMPLETE
COMMENTS WELCOME

Abstract. This paper estimates the extent to which changes in marginal tax rates induce changes in the propensity of taxpayers to contribute to tax-deferred savings accounts, including individual retirement accounts and employer-based plans. Information on contributions to tax-deferred accounts reported on W-2 forms was merged with a 1999-2005 panel of tax returns that spans the tax changes in EGTRRA and JGTRRA to estimate responsiveness on both the intensive margin (how much to contribute) and the extensive margin (whether or not to contribute). The results suggest little responsiveness to the tax price of contributing, but significant responsiveness to after-tax income. The estimates imply that the 2001 and 2003 tax changes increased the amount contributed to tax-deferred accounts by 2%, and increased the probability of contributing to a tax-deferred account by .6%.

* Phone: (202) 622-1316. Email: Bradley.Heim@do.treas.gov.
Address: 1500 Pennsylvania Ave NW, Washington, DC 20220. I wish to thank Jon Bakija for providing his comprehensive tax calculator, and Itai Lurie for helpful comments. The views expressed are those of the authors and are not necessarily those of the U.S. Department of the Treasury.

1. Introduction

Since the creation of Individual Retirement Accounts (IRAs) in 1974, and the issuance of 401(k)-clarifying regulations in 1981, tax-deferred accounts have become an important vehicle for saving for retirement in the United States. In 2004, assets in IRA and 401(k)-type defined contribution accounts amounted to slightly over \$6 trillion, far exceeding the \$1.9 trillion in assets held in defined benefit plans.¹ In addition, 28.7 percent of all families owned some form of IRA², and 30.6% of families participated in an employer-based defined contribution plan. To encourage saving for retirement, these plans allow a taxpayer to exclude contributions to the plan from income when figuring taxable income, but distributions from the plan (including contributions and account earnings) are taxable.³ As a result, making a contribution to these plans decreases an individual's taxable income in the tax year in which the contribution is made, and so decreases the individual's taxes owed. This paper examines the extent to which changes in marginal tax rates affect participation in and the amount of contributions to tax-deferred savings plans.

Tax-deferred retirement accounts come in two different forms. Employer-based accounts (including 401(k), 403(b), 457(b), SIMPLE, SEPs, and other plans) must be established by an employer.⁴ The employee may then make contributions to their

¹ See Copeland (2006), p. 4.

² Including regular, rollover, and Roth IRAs. See Copeland (2006), p. 20.

³ If a withdrawal is made before a certain age (generally 59 ½), the withdrawal is subject to an additional 10% penalty. However, there are several exceptions to this rule.

⁴ The plans differ according to the type of employer - private employers may set up 401(k) plans, 403(b) plans are set up by charitable organizations and public schools, 457(b) plans are set up by state and local governments, and SIMPLE and SEP plans may be set up by small employers.

account, generally through payroll deductions, subject to annual limits.⁵ In addition, employers often make matching contributions to an employee's account, generally figured as a percentage of the employee's contributions.

Individual Retirement Accounts, on the other hand, are established by the taxpayer, and come in two types. In a traditional IRA, contributions are deductible (subject to annual limits) when figuring adjusted gross income. However, if a taxpayer or their spouse is covered by an employer sponsored retirement plan (including defined contribution or defined benefit plans), the amount of the deduction is phased out at certain income levels.⁶ Like employer-based plan contributions, distributions from the plan (including initial contributions and any account earnings) are taxable. In a Roth IRA, contributions are not deductible, but account earnings accumulate tax free, and distributions are not taxable. Since contributions to Roth IRAs are not reported to the IRS, this study focuses on contributions to traditional IRAs.

Because of the large and growing size of tax-deferred savings accounts, and the diminishing prevalence of defined benefit retirement plans, several papers have examined the extent to which the availability of these plans increase savings among participants. Several other papers have examined how participation in these accounts varies with a wide variety of individual and plan characteristics. However, little attention has been paid to how participation in and contributions to tax-deferred savings plans vary with the tax environment.

⁵ In 2008, for 401(k), 403(b), 457(b), and SEP plans, these limits were \$15,500 (with an additional \$5,000 for participants aged 50 and older). SIMPLE plans had a limit of \$10,500 (with an additional \$2,500 if 50 and older).

⁶ In 2008, for taxpayers with covered by an employer-based plan the deduction is phased out between \$53,000 and \$63,000 for single and head of household filers and between \$85,000 and \$105,000 for married filing jointly.

In recent years, a number of tax changes have changed the impact of contributions to tax-deferred accounts on the amount of tax owed by the taxpayer, including changes in marginal tax rates, the introduction of the Saver's Credit, and a change in the way the Earned Income Tax Credit is calculated. This paper, then, seeks to answer two questions about these changes. First, among those who contribute to tax-deferred plans, did these changes in tax policy induce individuals to increase or decrease contributions to those plans? Second, did these tax policy changes induce more or less participation in these plans?

Knowing the answer to these questions is important for at least two reasons. First, if tax changes lead to changes in tax-deferred retirement savings, then tax rates can be viewed as an additional instrument that policymakers can use to affect the level of retirement savings. Second, knowledge of the extent to which changes in tax rates encourage or discourage the use of tax-deferred savings accounts is needed to accurately gauge the revenue impact of tax changes, since an increase in tax-deferred contributions will decrease revenue when the contributions are made, but increase revenue when withdrawn.

This paper uses data from a 1999-2005 panel of tax returns to examine whether the amount contributed to tax-deferred savings accounts, and the propensity of taxpayers to contribute, changed in response to changes in tax policy over these years. The results suggest little responsiveness to the tax price of contributing, but significant responsiveness to after-tax income. The estimates imply that the 2001 and 2003 tax changes increased the amount contributed to tax-deferred accounts by 2%, and increased the probability of contributing to a tax-deferred account by .6%.

The paper proceeds as follows. In Section 2, the relevant literature is reviewed. Section 3 describes the tax changes that occurred during the period of analysis. Section 4 describes the data and estimation strategy and Section 5 presents the results. Section 6 concludes.

2. Literature Review

The effect of the existence of tax-deferred savings plans on the savings rates of households has been widely debated in the literature. Several papers (surveyed in Poterba, Venti and Wise (1996)) have found that these plans tend to increase savings among plan participants, whereas other authors (surveyed in Engen, Gale and Scholz(1996)) have found that most of the contributions to these plans consist of amounts that would have been saved otherwise (either in non-tax-deferred instruments, or by borrowing less to finance other assets).

Several papers have also attempted to characterize the determinants of participation in tax-deferred retirement plans, and the determinants of the amounts that are contributed to these plans.⁷ These papers have generally found that the probability of participating in a tax-deferred retirement savings plan increases with income, age, job tenure, the existence of an employer match, and if the savings plan is the sole retirement plan for the household. In addition, a recent set of papers⁸ have found that default policies of the retirement plan (for example, whether workers are automatically enrolled in the plan, or whether they have to affirmatively choose to contribute to the plan) significantly affect whether a worker contributes to a tax-deferred account.

⁷ See, for example, Papke (1995), Bassett et al. (1998), Clark and Schreiber (1998), Kusko et al. (1998) Springstead and Wilson (2000), Munnell et al. (2001/2002), and others.

⁸ Including Madrian and Shea (2001), Choi, et al. (2004), and others.

Less attention has been paid to the effect of tax rates on contributions to tax-deferred savings plans. Currently, three papers look to some extent at the role that taxes play in the decision to contribute to tax-deferred savings accounts.

Joulfaian and Richardson (2001) use a cross-section of tax returns from 1996 to estimate the probability of participation in a tax-deferred savings plan as a function of demographic characteristics and marginal tax rates. They find that higher marginal tax rates tend to increase the probability of participation

Power and Rider (2002) examine the effect that tax-based savings incentives (including Keogh plans and Simplified Employee Pension plans) have on the self-employed. They use a panel of tax returns from sole proprietors in 1985, 1989, and 1993, and find that the elasticity of contributions to the tax price of contributing is around -2. They also find that the self-employed respond to lower tax prices on the extensive margin by contributing to a retirement plan.

Cunningham and Englehardt (2002) use W-2 records from households in the Health and Retirement Survey to infer contributions to 401(k) type savings plans. They then estimate a tobit of contributions to these plans as a function of demographic characteristics, and characteristics of the plan for which the individual is eligible, and the value of contributing to a 401(k) relative to the value of contributing to an IRA (which is a function of marginal tax rates, limits on IRA contributions, and other variables). In all specifications, the estimated coefficient on the relative value variable is insignificant.

This paper extends this previous work by using a dataset of tax returns matched to W-2 forms to examine the extent to which changes in tax policy affect wage and salary employees' contributions to IRA and employer-based plans, both on the intensive margin

(the decision of how much to contribute) and on the intensive margin (the decision of whether to contribute). Further, because I have panel data, I am able to control for unobserved characteristics of the taxpayer that are correlated with both their tax rate and their participation and contribution behavior.

3. Recent Tax Changes

Between 1999 and 2005, two major federal tax laws were passed that affected the after tax price of contributing to a tax-deferred savings account: the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) and the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA).⁹ These tax policy changes are described below.

Prior to the passage of EGTRRA, the federal tax rate structure consisted of five brackets, ranging from 15% to 39.6%. Retroactive to July 1, 2001, EGTRRA created a sixth tax bracket, for which the tax rate was 10% on the first \$12,000 of taxable income for married couples and \$6,000 for single filers. The proceeds of this tax reduction were sent out in the form of rebate checks in 2001, and in subsequent years, this rate was applied when tax returns were filed. In addition, in 2001, all of the remaining tax rates above the 15% bracket were reduced by half of a percentage point. These same rates were reduced an additional half of a percentage point in 2002.

Starting in 2002, EGTRRA also established a non-refundable tax-credit for low and

⁹ In addition, the Working Families Tax Relief Act was passed in 2004. This act, however, consisted mainly of extensions of previously passed provisions, and so did not impact marginal tax rates directly.

moderate income filers known as the Saver's Credit.¹⁰ The Saver's Credit provides a tax credit for contributions to qualified retirement savings, including both employer-based plans and IRAs. The credit is figured as a percentage (either 50, 20, or 10 percent) of contributions up to \$2,000, where the applicable rate depends on the adjusted gross income and filing status of the taxpayer.

In addition, EGTRRA changed the way contributions to employer-based accounts are treated when figuring the earned income tax credit (EITC). Prior to 2002, a taxpayer added pre-tax salary reductions (including contributions to employer-based plans) to the wages reported on the taxpayer's 1040 when calculating earned income. So, contributing a dollar of earnings to a tax-deferred account had no effect on a taxpayer's EITC. Starting in 2002, however, these amounts were not added back when figuring earned income for the EITC, so an additional dollar of earnings contributed to an employer-based account may affect the taxpayer's EITC.¹¹ This policy change has the effect of lowering the after tax price of contributing to an employer-based account for those in the phase-out range of the EITC.¹²

Under EGTRRA, tax rate reductions and standard deduction increases were scheduled to take effect in 2004, 2005, and 2006. The passage of JGTRRA in 2003, however, accelerated to 2003 the tax changes scheduled to occur under EGTRRA, resulting in marginal tax rates ranging from 10% to 35% and an increased standard

¹⁰ The Saver's Credit was initially scheduled to expire at the end of 2006, but was made permanent by the Pension Protection Act of 2006.

¹¹ For example, consider a taxpayer with one child in the phase-out range of the EITC, who faces a phase-out rate of 15.98 percent. Prior to 2002, if they earned an additional dollar, regardless of whether they took it as income or contributed it to an employer-based account, their EITC would decrease by 15.98 cents. Starting in 2002, however, if they took the dollar as income, their EITC would decrease by 15.98 cents, but if they contributed the dollar to an employer-based account, their EITC would not change.

¹² It also has the effect of increasing the price of contributing for those in the phase-in range of the EITC, but the proportion of that group contributing to employer-based accounts is likely to be very small.

deduction for married taxpayers.

4. Data and Estimation Method

4.1 Data

The data used in this study come from a seven year panel of tax returns known as the 1999-2005 Edited Panel.¹³ For the estimation, the panel is cut to include only the Continuous Work History Subsample (CWHS), which consists of a random sample of taxpayers for which the primary filer's social security number ended in one of five four-digit combinations. Over the seven years, the CWHS sample consists of 384,517 returns from 63,321 different taxpayers. Of these taxpayers, 69% are in the sample all seven years.

The sample was cut to include only returns where both taxpayers (primary and secondary) are aged 25 to 55, to focus on taxpayers who are in their prime earning years. This age cut eliminates those who might be finishing their schooling, and also eliminates those who would be eligible to withdraw from their tax-deferred savings account without penalty because they had reached the threshold age.

Amounts contributed to tax-deferred accounts come from two places. Contributions to traditional IRA accounts come from the relevant line of the taxpayer's form 1040.¹⁴ Contributions to employer-based retirement accounts come from the relevant boxes in the W-2 dataset that was matched to the sample of tax returns.¹⁵ When a W-2 form is filed,

¹³ For more information on the 1999 Edited Panel, see Weber and Bryant (2005). The full Edited Panel consists of the CWHS random sample and a high income oversample.

¹⁴ Line 23 in 1999-2001, line 24 in 2002-2003, line 25 in 2004, and line 32 in 2005.

¹⁵ Box 13 in 1999-200, box 12 in 2001-2005.

an employer is required to report any amount withheld and contributed to a tax-deferred account. In addition, the employer enters a code for the type of account,¹⁶ and checks a box for whether the taxpayer was an active participant in a retirement plan.¹⁷ Using the amount and type of accounts fields, it is possible to identify exactly how much was contributed to each type of account for each taxpayer with matching W-2 forms. In addition, knowledge of whether the taxpayer was an active participant in a retirement plan, along with AGI and filing status variables, allows for the calculation of the limit on deductible IRA contributions for each taxpayer for whom W-2 forms are available. There were, however, some observations for which wages and salaries were reported on form 1040, but no corresponding W-2 form existed in the W-2 dataset. Because it is not possible to observe whether contributions to an employer-based retirement account were made for these taxpayers, they are eliminated from the estimation sample.

Unfortunately, the W-2 form does not contain detailed information about the employer's plan (including match rates), nor does it contain any information that would allow identification of taxpayers who were for an employer-based retirement savings plan but did not contribute.

The lack of detail about match rates in an employer's plans is offset somewhat by the availability panel data, since individual and time fixed effects can be included to control for unchanging match levels at the individual level and nationwide trends in match rates. To the extent that changes in match rates are correlated with changes in tax law at the within-individual level (for example, if individuals with larger increases in the

¹⁶ Different codes exist for 401(k), 403(b), SEP, 457(b), 501(c), and SIMPLE plans.

¹⁷ Generally, an employee is considered to be an active participant if they are covered by either a defined benefit plan or a defined contribution in which employer or employee contributions were added the account in the current tax year.

after-tax price of contributions tend to have also experienced larger decreases in match rates), the results in my regression may be biased, but the size of this bias is likely to be small.

More of a concern is the lack of information on eligibility to contribute to a retirement plan. Since one aim of this study is to estimate whether taxpayers responded to the recent tax changes by initiating or ceasing making contributions to a retirement account, some proxy for being eligible to contribute to an account needs to be created. Fortunately, as noted above, the dataset contains enough information to enable the identification of taxpayers who were eligible to contribute to a traditional IRA. In addition, any taxpayer who contributed to an employer-based plan is clearly eligible. So, the remaining group to be identified includes taxpayers who were eligible for an employer-based plan but did not contribute, and were not eligible for contributions to a traditional IRA (primarily because of the income limits that apply to IRAs).

Two different definitions of eligibility were tried. In the first, this latter set is assumed to be empty, so that a taxpayer is considered eligible to contribute to a tax-deferred account if they either contributed to an employer-based plan, or were eligible to contribute to an IRA (whether or not they actually contributed). As noted above, this definition of eligibility will miss higher-income taxpayers who were eligible for an employer-based plan but did not contribute, and were not eligible to contribute to an IRA. This group, however, is likely to be relatively small. In the second definition, information on contributions from other years in the panel is used to attempt to identify eligible non-contributors. For this definition, a taxpayer who works in a particular year for an employer at which a contribution to an employer-based plan is made in at least one

year of the panel is considered eligible to contribute to an employer-based plan in that year.¹⁸ This definition will correctly pick up taxpayers who were eligible for all years they worked for a particular employer, and who contributed at least once. However, it will not pick up workers who were eligible in all years but never contributed, and it will erroneously include taxpayers who stayed at the same employer, but whose eligibility changed over time. The advantage of using this second definition is that it allows for the estimation of responsiveness on the extensive margin for employer-based plans alone, but the problems with this definition must also be noted.

The tax price of contributing¹⁹ is given by

$$(1) \quad P = \begin{cases} \frac{(1 - \tau_I - \tau_p)}{(1 - \tau_p - \tau_{EITC})} & \text{if } year < 2002 \\ \frac{(1 - \tau_I - \tau_p)}{(1 - \tau_p + \tau_{SAV})} & \text{if } year \geq 2002 \end{cases}$$

where τ_I denotes the individual's marginal income tax rate (including federal and state taxes), τ_p is the marginal payroll tax rate (employee's share), τ_f^{EITC} and τ_s^{EITC} are the marginal federal and state EITC rates, and τ_{SAV} is the marginal Saver's Credit rate. The first dollar tax price is calculated using the marginal tax rates that apply to the taxpayer when all contributions (both to employer-based and individual accounts) are set to 0. The last dollar tax price is calculated using the marginal tax rates that applied to the taxpayer given their actual contributions to these accounts.

The tax price before 2002 reflects the fact that contributions to tax-deferred accounts were counted as income for EITC purposes in those years, whereas the tax price

¹⁸ For example, if a taxpayer was observed working at the same employer all years of the panel, and contributed to an employer-based plan in 2000, they would be considered eligible to contribute in all years of the panel.

¹⁹ Like other studies in this literature, the tax price does not account for the tax on withdrawals in a future year. The full impact of the contribution on taxes owed would depend on the taxpayer's tax marginal tax rate in the year of withdrawal, the rate of time preference, and the rate of return on the asset purchased with the contribution.

2002 and after reflects the introduction of the Saver's Credit.²⁰ The way to incorporate the Saver's Credit is unclear, however, since Koenig and Harvey (2005) found that 34 percent of those eligible to claim the credit did not do so. To account for imperfect take-up in the tax prices, the Saver's Credit rate is incorporated in the first dollar tax price for any taxpayer that would be eligible to claim it if they contributed to a tax-deferred account, but is only incorporated in the last dollar tax price if the taxpayer actually claimed the Saver's credit in that year.

Finally, after-tax income is defined as income after taxes before any contributions to tax-deferred accounts are made.

Sample statistics for the estimation sample are presented in Table 1. The first column presents means and standard deviations of the relevant variables for all contributors. The second column presents these statistics under the first definition of eligibility (contributing to an employer-based plan or eligible to contribute to an IRA), and the third column presents these statistics under the third definition (working at an employer at which a contribution was made in some year, or eligible to contribute to an IRA). The contributor subsample consists of 68,543 observations, whereas the two eligible samples consist of 134,187 and 136,167 observations, respectively. The mean after tax income among contributors is \$75,419, which is approximately \$20,000 higher than the mean among those who are eligible to contribute under either definition. In addition, contributors tend to be more likely to be married, are older, and are more likely to itemize.

²⁰ In 2002 and beyond, for EITC recipients the tax price for contributing to an employer-based plan is different from the tax-price for contributing to an IRA, since contributions to an IRA are taken into account when calculating earned income for EITC purposes. To simplify the specification, because contributions to employer-based plans are likely to be more prevalent among this population, I use the tax price that applies to employer-based plans in the regressions.

Table 2 presents the means of the first dollar tax price, an indicator variable for making a contribution, and total contributions among contributors, for all observations and for subgroups divided by income (whether income modally fell below \$50,000 across all years of the panel, modally fell between \$50,000 and \$100,000, or modally was above \$100,000). For this table, the sample was cut to include those who were eligible to contribute under the most lenient definition of eligibility. In addition, in order to remove variation due to sample composition changes across years, the sample was cut to include only taxpayers who were present in the sample all seven years. In the first panel, among all members of the sample, the mean first dollar tax price drops slightly between 1999 and 2001, drops a greater amount in 2002, then increases in 2003 to its former level before decreasing slightly in 2004 and 2005. Breaking this trend out by income group, however, shows that these means masks substantial heterogeneity across income levels. For the lowest group, the tax price declines slightly between 1999 and 2001, then decreases substantially in 2002 due to the introduction of the Saver's Credit and the exclusion of employer-based retirement plan contributions from earnings for EITC purposes.²¹ As noted above, this provision would decrease the tax price of contributing for those in the phase-out range of the EITC. The tax price then increases in 2003 due to the JGTRRA marginal tax rate reductions. For the middle and upper income groups, on the other hand, the tax price stays relatively constant between 1999 and 2002, then increases in 2003 due to the JGTRRA marginal tax rate reductions

In the second panel, levels of participation in tax-deferred retirement savings accounts are seen to increase across the years of the sample, with a jump between 1999 and 2000, and a steady increase thereafter. It appears that this increase is centered among

²¹ This increase is ameliorated somewhat by the introduction of the Saver's Credit.

the lowest two income groups, with an increase of 25% for the lowest income group and of 9% for the middle income group. The highest group income group increases in 2000, but then stays relatively stable through the rest of the period.

The last panel presents mean contributions among contributors. Overall, contributions increased steadily from 1999 to 2005. Here, the increases are spread across all group, with contributions among the lowest group increasing by 20% between 1999 and 2005, the middle group increasing by 31%, and the highest group increasing by 41%.

Looking at these trends, it is hard to discern any obvious negative relationship between the price of contributing to a tax-deferred account and either the propensity to give or the level of giving. If anything, the two seem to be positively related. However, these aggregate trends could be confounded by changes in incomes and the macroeconomy that affect contributions to retirement accounts, and they do not exploit variation across individuals and across time within an individual taxpayer. The empirical specification, then, will help to discern whether any relationship between these variables arises under a more comprehensive identification strategy.

4.2 Estimation Method

For the empirical specification, the individual's decision to contribute to a tax-deferred savings account is modeled as consisting of two parts. First, the taxpayer chooses whether to contribute to an account or not. Second, if they choose to contribute they decide how much to contribute. Hence, the two choices can be represented by the following demand model:

$$(2) \quad C^*_{it} = \beta_1 \ln(P^0_{it}) + \beta_2 \ln(Y_{it}) + \beta_3 X_{it} + V_i + \varepsilon_{1it},$$

$$(3) \quad \ln(C_{it}) = \alpha_1 \ln(P_{it}) + \alpha_2 \ln(Y_{it}) + \alpha_3 X_{it} + V_i + \varepsilon_{2it} \quad \text{Conditional on } C_{it}^* = 1$$

where C_{it}^* is one if the taxpayer makes a contribution to one or more tax-deferred accounts and zero otherwise, and C_{it} is the total amount contributed. P_{it}^0 is the after tax price of the first dollar contributed to a retirement account (the first dollar tax price), P_{it} denotes the after tax price of the marginal dollar contributed to a retirement account (the last dollar tax price), Y_{it} denotes the income of the taxpayer after taxes if no contributions were made, X_{it} is a vector of characteristics of the taxpayer's characteristics that vary over time, V_i is a vector of characteristics that do not vary over time, and ε_{it} is the error term.

Included in X_{it} are age and age squared (because contributions have been found to significantly vary with the age and/or tenure of an employee), the number of children and number of children away from home (because the presence of children, and particularly children in college, may affect a taxpayer's ability to save for retirement), and indicator variables for being married, the primary filer being female, being an itemizer, and the region of the country in which the taxpayer resides.

Because panel data are used in this study, individual fixed effects can also be included or first differencing can be utilized to net out unobservable characteristics that are correlated with both the tax price of contributing and the propensity to contribute or the amount contributed. For example, suppose that some people tend to have a greater preference toward saving, and that this group also tends to have higher income, which in turn implies a lower tax price of contributing. This would lead to a spurious positive correlation between saving and income, and a negative correlation between savings and the tax price of contributing. Including fixed effects or first differencing controls for this

characteristic, and so any effect of tax prices or income comes from variation across time within individual taxpayers.

Unlike some previous studies, the tax return data does not contain plan specific information. However, to the extent that plan characteristics for a given taxpayer are constant over time, including individual fixed effects will control for these variables. Further, not controlling for changes in these plan characteristics in the fixed effects specification only biases the results to the extent that they are systematically correlated with the changes in tax prices within taxpayers over time, which is much less of a concern than a correlation between match rates and marginal tax rates in the cross section.²²

Since the last dollar tax price is directly a function of the amount contributed to tax-deferred accounts, in the intensive margin (amount contributed) specifications, the last dollar tax price is instrumented with the first dollar tax price. In addition, since the tax prices are a nonlinear function of income in the current year, using the contemporaneous tax price as a regressor may pick up nonlinear effects of income, and including fixed effects or first differencing the data does not eliminate this. So, in the main specifications that follow, the data is first differenced, and the difference in contemporaneous tax prices is instrumented with a difference in synthetic tax prices, where the synthetic tax prices are calculated using all income and other tax variables

²² Higher income taxpayers (whose tax price is lower) are presumably more likely to work at firms that provide a larger match, possibly yielding a spurious negative correlation between the tax price and giving.

from the first year of the two year difference.²³ As a result, any variation in the instrument comes from changes in tax law across the two years.

5. Results

5.1 Intensive Margin

Table 3 presents the results of estimating the effect that recent tax changes have had on tax-deferred savings on the intensive margin, the decision of how much to contribute. Since both the amounts contributed and the tax and income variables are in logs, the coefficients on the tax price and after-tax income can be interpreted as the price and income elasticities of contributions.

In Column 1, Equation 3 is estimated without fixed effects. In this specification, both the tax price and after tax income enter with the expected signs and significantly, with a coefficient on the tax price estimated to be -0.363, and the coefficient on after-tax income estimated to be 1.114. Demographic characteristics generally enter with the expected sign. Older taxpayers tend to contribute more (though at a decreasing rate), itemizers tend to contribute more, and those with more children and with children away from home tend to contribute less. Interestingly, married couples are estimated to contribute less, and the estimated effect is strongly significant.

However, without controlling for individual fixed effects, these estimates are likely to be biased. If people who have an unobserved preference toward savings in general also tend to have higher income (and thus a lower tax price due to the

²³ For example, for the 1999-2000 difference, variables from 1999 are used to calculate the tax rates in 1999, then are inflated by the CPI to 2000 levels and used to calculate the tax rates that would have applied to the taxpayer in 2000 if their income and other variables had only increased with inflation.

progressivity of the income tax), these coefficients will both be biased upward in absolute value. In Column 2, then, fixed effects are added to the specification. As expected, the coefficient on after-tax income declines, and is now estimated to be 0.748. The coefficient on the after tax price, however, is wrongly signed and highly significant.

As noted above, since tax prices are a nonlinear function of income in the current year, the tax price in this specification may still be biased by picking up nonlinear effects of income. In Column 3, which is the base specification, the equation is estimated in first differences, and the change in the last dollar tax price is instrumented with the change in the synthetic first dollar tax price. In this specification, the coefficient on the tax price declines somewhat. Although it is still wrongly signed, it is now insignificant, suggesting that changes in the tax price per se do not have a significant effect on the amount that is contributed to tax-deferred accounts. The coefficient on the after tax income variable, however, is still strongly significant, with a coefficient of 0.628.

Columns 4 and 5 present the results of two robustness checks. One concern with the specification in Column 3 arises because there are annual limits on the amount that may be contributed to tax-deferred accounts. As a result, including in the sample taxpayers whose contributions are at or near these limits may bias the coefficients in this regression, since these taxpayers could not legally respond to the change in tax policy by increasing their contributions. So, in Column 4, any taxpayer who is observed to be contributing an amount that is within \$100 of their limit (including employer-based contributions and IRA contributions) is dropped from the sample. When this is done, the coefficient on the tax price declines in absolute value, and is still wrongly signed and insignificant. The coefficient on after-tax income, however, increases to 0.729.

In Column 5, to examine whether the results differ when taxpayers who don't consistently contribute to tax-deferred accounts are cut from the estimation sample, the specification in Column 3 is altered to include only taxpayers who contributed to an account in all of the years they are observed in the sample. In this column, the results don't change markedly from the base specification – the coefficient on the tax price is still positive but insignificant, and the coefficient on after-tax income is now estimated to be .546, and is still strongly significant.

Table 4 cuts the sample according to the income level of the taxpayer and according to whether one or two taxpayers are observed to be contributing to an account. Across these columns, no definitive pattern emerges for the tax price. All coefficients on the tax price are insignificant, though the coefficient is correctly signed for those whose income modally falls between \$50,000 and \$100,000. Increases in after tax income tend to increase contributions to a lesser extent for taxpayers in the highest income group, though this is surely partly because some of these taxpayers are likely to hit against the limits on contributions. The effect of income does not appear to depend, however, on the number of contributors.

To examine whether contributing behavior differs depending on the type of accounts the taxpayer is contributing to, in Table 5 the left hand side contribution variable is now the amount of contributions to a particular type of account. For comparison, column 1 repeats the estimated coefficients from Column 3 of Table 2, where the dependent variable is contributions to all types of accounts (both IRA and employer-based plans). In Column 2, the dependent variable includes only contributions to individual retirement accounts. Here, the tax price coefficient is insignificant, and the

estimated effect of after-tax income is small and only marginally significant. In Column 3, the dependent variable is contributions to employer-based plans. In this case, the coefficients on both the tax price and after-tax income are similar to the base specification. Columns 4 through 9 break out the results in Column 3 by type of employer-based plan. The tax price enters negatively in four of these specifications (for 403(b), SEP, 457(b), and SIMPLE plans), but the standard errors are such that none of these coefficients are significant. It does appear, however, that contributions to 401(k) plans tend to be more responsive to changes in income than the other types of plans, with an estimated after-tax income coefficient of .677, while the income coefficients for other types of plans are either below .5 or insignificant.

5.2 Extensive Margin

Table 6 presents the results of estimating the responsiveness to recent tax changes on the extensive margin, the decision of whether to contribute. In Columns 1-3, the sample is cut to include taxpayers who were eligible to contribute by the first definition (contributing to an employer-based plan or eligible to contribute to an IRA). Since the tax price and after-tax incomes are entered in the regressions in logs, the estimated coefficients can be interpreted as semi-elasticities.²⁴

In Column 1, Equation 2 is estimated without fixed effects. In this specification, similar to the intensive margin specification without fixed effects, both the tax price and after tax income enter with the expected signs and significantly, with a tax price coefficient of -0.116 and an income coefficient of 0.259, where both are highly

²⁴ That is, the percentage point change in the probability of contributing that would result from a one percent change in the tax price or after-tax income.

significant. The demographic characteristics generally enter with the expected sign, with married taxpayers, older taxpayers, and itemizers more likely to contribute, and taxpayers with children less likely to contribute.

Again, however, not controlling for the unobserved propensity to save could bias both these coefficients upward in absolute value. In Column 2, it appears that this is indeed the case. When fixed effects are included, the coefficient on the tax price drops to -0.018, and the income coefficient drops to 0.149, though both are still significant.

Finally, in the base specification in Column 3, when a first difference specification is used, and the change in the first dollar tax price is instrumented with the change in the synthetic first dollar tax price, the coefficient on the tax price increases slightly to -0.034, though because of an increased standard error, the estimated coefficient is insignificant. The after-tax income coefficient declines slightly to 0.100, though the estimate is still highly significant.

In Column 4, the definition of eligibility is expanded to definition 2, which includes as eligible taxpayers working at an employer at which a contribution to an employer-based plan was made in some year and taxpayers who were eligible to contribute to an IRA. The estimates of the effects of the tax price and after-tax income on contributing are almost identical to when the first definition is used. The estimated coefficient on the first dollar tax price is -0.027 (though again is insignificant), and the estimated coefficient on after-tax income is 0.103.

In Column 5, the sample is cut to only include those who were eligible to contribute to an employer-based plan by definition 2. When this is done, significant coefficients are found for both the tax price and after tax income, and these effects are

larger than when employer-based plan and IRA contributions are combined. The coefficient on the tax price is estimated to be -0.112, and the coefficient on after-tax income is estimated to be 0.161.

Finally, Table 7 cuts the sample according to the income level of the taxpayer and according to whether one or two taxpayers are observed to be contributing to an account. In this table, only the coefficients on the tax price and after tax income variables are presented. The top panel presents results from the sample of those who were eligible to contribute under the first definition of eligibility, the middle panel presents results when the sample includes those who were eligible to contribute to any plan under the second definition of eligibility, and the bottom panel presents results from the sample of those eligible to contribute to an employer-based plan under the second definition of eligibility.

The leftmost three columns cut the sample according to the income level of the taxpayer. In the top panel, under the first eligibility definition, the after-tax income variable enters significantly for all three income groups, with coefficients ranging from 0.072 to 0.149, though the middle income group is estimated to be the most responsive. The first dollar tax price enters insignificantly for the upper and lower income groups, but is correctly signed and significant for the middle income group, with an estimated coefficient of -0.192. The results in the middle panel are similar to the top, though the coefficient on the tax price for the middle income group has fallen somewhat, and is now insignificant. When the sample is cut to include only those eligible for an employer-based plan in the bottom panel, all tax price coefficients are insignificant, though the income coefficients are still significant across all income groups.

The two rightmost columns present results when the sample is cut according to the number of eligible taxpayers. For the first and second definitions of eligibility, little difference is found between taxpayers with one eligible contributor and taxpayers with two eligible contributors. However, in the bottom panel, the tax price enters significantly only for the two eligible contributors group, with a coefficient of -0.126, suggesting that married taxpayers with both filers eligible to contribute to an employer-based plan are responsive to changes in the tax price of such contributions.

5.3 Implied Effects of Recent Tax Changes

Using the coefficients estimated above, it is possible to infer the implied effect of the recent tax changes on both the amount of contributions among those who contributed, and on the probability that a taxpayer contributed to a tax-deferred account. When calculating these effects, it is important to recall that the EGTRRA and JGTRRA tax laws resulted in changes to both the tax price of contributing to a tax-deferred account (the marginal tax rate decreases increased the tax price of contributing, while the introduction of the Saver's Credit and the change in the tax treatment of contributions for EITC purposes decreased the tax price of contributing) and to pre-contribution after-tax incomes (all of the tax changes discussed in this paper increased after-tax incomes).

To estimate the implied effects of these changes, the sample was cut to those who were present in 1999 and were part of the estimation sample for either the intensive margin specification or the extensive margin specification under the more lenient definition of who was eligible to contribute. These taxpayers' income and other tax

relevant characteristics were used to calculate what their tax price and after tax income would have been in 2005 if all nominal variables had increased with inflation and all other characteristics had stayed constant. Comparing these counterfactual tax prices and after-tax incomes to the actual amounts from 1999 yields a measure of the effect of the recent tax changes that is invariant to changes in sample composition or in the macroeconomy. Using the coefficients estimated in the preceding tables, one can then infer the implied effect of changes in tax prices and after-tax incomes on the amount of contributions and the probability of contributing. For the calculations that follow, wrongly signed coefficients were set to zero when inferring the impact of a change in the tax price.

The results of this exercise are presented in Table 8. The top panel presents calculations of the implied effect of the tax changes on the intensive margin. In the first row, among the entire sample, the mean tax price increased by 2.7%. However, the estimated coefficient on the tax price was wrongly signed and insignificant, so the effect of this change on contributions is assumed to be zero. Mean after-tax income increased by 3.2% because of the tax changes, which combined with an estimated after-tax income elasticity of .628, implies a 2% increase in contributions. Thus, the overall implied increase in contributions is 2%.

The next three rows repeat these calculations for the three income groups. Looking across these rows, for no group was there an increase in contributions due to changes in the tax price. However, as a percent of contributions, the lowest two income groups increased their contributions the most (by 2.1%) in response to the tax changes, while the high income group increased their contributions the least (by 1.2%).

The bottom panel presents calculations of the implied effect on the extensive margin. Since there was almost no change in the mean tax price among the total sample eligible to contribute by the more lenient definition, the tax price is calculated to not have any effect on the probability of contributing. However, the 3% increase in the mean after-tax income implies a .6% increase in the probability of contributing.

Looking across income groups, the lowest income group is estimated to have the greatest implied effect of the tax changes, with a decrease in the tax price of 2.6% leading to an increase in the probability of contributing of 1%, and the 2.8% increase in after-tax income leading to an increase in the probability of contributing of 6.4%, for a total increase of 7.4%. For the middle income group, the effect of the increase in the tax price is estimated to be offset by the effect of the increase in after-tax income, with no change overall. For the highest income group, the 3.5% increase in the after tax price is estimated to decrease the probability of contributing by 1.0%, which exceeds the .4% increase that is estimated to result from the increase in after-tax income for this group, yielding an overall decrease in the probability of contributing.

6. Conclusion

This paper estimated the responsiveness of contributions to tax-deferred accounts (including IRAs and employer-sponsored plans) to recent tax changes, including the marginal tax rate reductions that were part of EGTRRA2001 and JGTRRA2003, the introduction of the Saver's Credit, and the change in the EITC treatment of contributions to employer-based plans. For the estimation, a panel of tax returns spanning 1999-2005 were matched to information from W-2 forms.

The results suggested that taxpayers generally did not respond significantly to changes in the tax price of contributing (either on the intensive or extensive margin), with the one exception being a significant response on the decision of whether to contribute among those who were imputed to be eligible to contribute to an employer-based plan. However, significant and sizable responses were found in nearly all specifications to changes in after-tax incomes.

Overall, the estimates imply that the 2001 and 2003 tax changes increased the amount contributed to tax-deferred accounts by 2%, and increased the probability of contributing to a tax-deferred account by .6%, though there is significant heterogeneity in these effects across income groups, with lower income taxpayers estimated to have increased the amount contributed and the probability of contributing by the greatest percentage.

Some caveats to these results should be noted. Since W-2 forms do not include any information on whether the taxpayer was eligible to contribute, eligibility had to be imputed. Thus, to the extent that the imputations were incorrect, the results on the extensive margin may be biased in some direction. Fortunately the two different definitions yielded largely similar results, suggesting that such a bias may be small. In addition, W-2 forms do not contain information on the availability or amount of an employer match to contributions. Though including fixed effects control to some extent for the lack of this information, to the extent that changes in match rates were correlated within an individual with changes in tax rates or after-tax incomes, the resulting coefficients may be biased somewhat.

Though the magnitude of these biases is probably small, information from the

employer's Form 5500 could be used to attempt to control better for both eligibility to contribute to an employer-based plan and for the availability and amount of an employer match.²⁵ On Form 5500, firms that offer pension and welfare benefit plans generally are required to report on the plan's financial condition, investments, and operations. Included in the data collected are variables on plan eligibility, participation, and contributions. Such an undertaking would require matching information from all employers of members of the panel to the individual tax records in the panel, and so is left to future research.

Nevertheless, the results in the current study suggest that changes in tax rates that result in increased after-tax incomes may indeed have a role in increasing contributions to tax-deferred retirement accounts. Whether these increased contributions translate to increased savings rates, however, is still an open question.

²⁵ Data from Form 5500 was used in Papke (1995), who estimated the responsiveness of participation and contributions to 401(k) plans at the firm level.

References

- Bakija, Jon. (2008). "Documentation for a Comprehensive Historical U.S. Federal and State Income Tax Calculator Program" Working paper, Williams College.
http://www.williams.edu/Economics/papers/bakijaDocumentation_IncTaxCalc.pdf
- Bassett, William, Michael Fleming, and Anthony Rodrigues. (1998). "How Workers Use 401(k) Plans: The Participation, Contribution, and Withdrawal Decisions." *National Tax Journal*. 51(2):263-289.
- Choi, James, David Laibson, Brigitte Madrian, and Andrew Metrick. (2004). "For Better or For Worse: Default Effects and 401(k) Savings Behavior" in David Wise, ed., *Perspectives on the Economics of Aging*, University of Chicago Press, 2004
- Choi, James, David Laibson, and Brigitte Madrian. (2004). "Plan Design and 401(k) Savings Outcomes." *National Tax Journal*. 57(2):275-298.
- Clark, Robert and Sylvester Schieber. (1998). "Factors Affecting Participation Rates and Contribution Levels in 401(k) Plans." in *Living with Defined Contribution Pensions: Remaking Responsibility for Retirement*, ed. By Olivia S. Mitchell and Sylvester J. Schreiber, 69-97. Philadelphia: University of Pennsylvania.
- Cunningham, Christopher R. and Gary V. Englehardt. (2002). "Federal Tax Policy, Employer Matching, and 401(k) Saving: Evidence from HRS W-2 Records." *National Tax Journal*. 55(3):617-645.
- Joulfaian, David and David Richardson. (2001). "Who Takes Advantage of Tax-deferred Retirement Saving Programs? Evidence from the Federal Income Tax Data." *National Tax Journal*. 54(3):669-688.
- Koenig, Gary and Robert Harvey. (2005). "Utilization of the Savers Credit: An Analysis of the First Year." *National Tax Journal*. 58(4):787-806.
- Madrian, Brigitte and Dennis Shea. (2001). "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior." *Quarterly Journal of Economics*. 116(4):1149-1187.
- Munnell, Alicia, Annika Sunden, and Catherine Taylor. (2001/2002) "What Determines 401(k) Participation and Contributions?" *Social Security Bulletin*. 64(3):64-75
- Papke, Leslie. (1995). "Participation in and Contributions to 401(k) Pension Plans: Evidence from Plan Data." *Journal of Human Resources*. 30(2):311-325.

- Poterba, James, Steven Venti, and David Wise. (1996). "How Retirement Saving Programs Increase Savings." *Journal of Economic Perspectives*. 10(4):91-112.
- Power, Laura and Mark Rider. (2002). "The Effect of Tax-Based Savings Incentives on the Self-Employed." *Journal of Public Economics*. 85:33-52.
- Springstead, Glenn and Theresa Wilson. (2000). "Participation in Voluntary Individual Savings Accounts: An Analysis of IRAs, 401(k)s, and the TSP." *Social Security Bulletin*. 63(1):34-39.
- Weber, Michael and Victoria L. Bryant. (2005). "The 1999 Individual Income Tax Return Edited Panel." in *2005 Proceedings of the American Statistical Association*. Alexandria, VA: American Statistical Association.

Table 1: Sample Statistics

<u>Income Variables</u>	<u>All Contributors</u>		<u>Eligibility Definition 1</u>		<u>Eligibility Definition 2</u>	
	<u>Mean</u>	<u>Std. Dev.</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Mean</u>	<u>Std. Dev.</u>
Indicator Variable for Making a Contribution	1.000	0.000	0.511	0.500	0.503	0.500
Total Contributions	\$4,242	\$4,181	\$2,167	\$3,664	\$2,135	\$3,647
Last Dollar Tax Price	0.722	0.098	0.776	0.144	0.774	0.144
First Dollar Tax Price	0.720	0.097	0.767	0.147	0.765	0.146
After Tax Income	\$75,419	\$174,244	\$55,819	\$132,569	\$56,491	\$140,452
<u>Demographic Variables</u>						
Married	0.664	0.472	0.554	0.497	0.555	0.497
Age	41.287	7.855	40.050	8.166	40.079	8.163
Age Squared	1766.401	638.030	1670.762	651.307	1673.047	651.285
Sex of Primary Filer (1=Female)	0.219	0.413	0.278	0.448	0.278	0.448
Number of Children	1.136	1.140	1.133	1.162	1.132	1.162
Child Away from Home	0.007	0.086	0.007	0.081	0.007	0.082
Itemizer	0.659	0.474	0.498	0.500	0.502	0.500
Census Division						
New England	0.061	0.240	0.053	0.223	0.053	0.223
Mid-Atlantic	0.146	0.353	0.143	0.350	0.143	0.350
East North Central	0.173	0.379	0.162	0.368	0.162	0.369
West North Central	0.081	0.273	0.071	0.257	0.071	0.257
South Atlantic	0.181	0.385	0.185	0.389	0.185	0.388
East South Central	0.054	0.225	0.060	0.238	0.060	0.237
West South Central	0.092	0.288	0.103	0.304	0.103	0.304
Mountain	0.062	0.241	0.063	0.243	0.063	0.242
Pacific	0.147	0.354	0.156	0.362	0.156	0.363
Year						
1999	0.149	0.356	0.158	0.364	0.158	0.365
2000	0.151	0.358	0.151	0.358	0.151	0.358
2001	0.149	0.356	0.147	0.354	0.147	0.354
2002	0.142	0.349	0.138	0.345	0.139	0.346
2003	0.136	0.343	0.135	0.341	0.134	0.341
2004	0.133	0.340	0.130	0.337	0.130	0.336
2005	0.139	0.346	0.141	0.348	0.140	0.347
Number of Observations	68,543		134,187		136,167	

Table 2: Means of Select Variables, by Year

<u>Subsample</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>
	<u>First Dollar Tax Price</u>						
All	0.770	0.762	0.760	0.733	0.759	0.753	0.751
Income Modally Less Than \$50K	0.853	0.847	0.839	0.777	0.804	0.796	0.794
Income Modally Between \$50K and \$100K	0.727	0.718	0.719	0.721	0.749	0.745	0.743
Income Modally Greater Than 100K	0.640	0.635	0.638	0.643	0.661	0.655	0.653
	<u>Indicator for Making a Contribution</u>						
All	0.547	0.577	0.583	0.592	0.593	0.602	0.610
Income Modally Less Than \$50K	0.316	0.342	0.351	0.367	0.372	0.385	0.394
Income Modally Between \$50K and \$100K	0.689	0.726	0.731	0.735	0.736	0.740	0.753
Income Modally Greater Than 100K	0.848	0.875	0.874	0.878	0.863	0.872	0.871
	<u>Total Contributions (Among Contributors)</u>						
All	\$4,006	\$4,261	\$4,347	\$4,461	\$4,609	\$4,898	\$5,192
Income Modally Less Than \$50K	\$1,628	\$1,673	\$1,671	\$1,648	\$1,732	\$1,817	\$1,958
Income Modally Between \$50K and \$100K	\$3,494	\$3,696	\$3,781	\$3,932	\$4,045	\$4,310	\$4,568
Income Modally Greater Than 100K	\$7,382	\$8,099	\$8,360	\$8,686	\$9,096	\$9,749	\$10,421

Notes: Sample was cut to include taxpayers who were present in sample all seven years, and who were eligible to contribute under eligibility definition 2.

Table 3: All Contributions, Intensive Margin

	No Fixed Effects	Fixed Effects	First Difference, Base Year Instrument	Excluding Those Near Limit	Including Those Who Contribute All Years
	(1)	(2)	(3)	(4)	(5)
Ln(Last Dollar Tax Price)	-0.363*** (0.067)	0.148*** (0.039)	0.107 (0.123)	0.076 (0.125)	0.136 (0.138)
Ln(After-tax Income)	1.114*** (0.026)	0.748*** (0.014)	0.628*** (0.031)	0.729*** (0.037)	0.546*** (0.037)
Married	-0.215*** (0.022)				
Age	0.018** (0.008)	0.046*** (0.008)			
Age-squared	-0.007 (0.010)	-0.022** (0.009)	-0.067*** (0.018)	-0.059*** (0.019)	-0.074*** (0.018)
Sex of Primary Filer	-0.115*** (0.019)	0.08 (0.132)	0.415* (0.215)	0.449* (0.234)	0.173* (0.092)
Itemizer	0.132*** (0.016)	0.008 (0.011)	0.011 (0.014)	0.006 (0.014)	0.010 (0.014)
Number of Children	-0.119*** (0.007)	-0.052*** (0.007)	-0.025*** (0.009)	-0.026*** (0.009)	-0.023** (0.009)
Number of Children Away from Home	-0.005 (0.058)	0.071* (0.041)	-0.033 (0.045)	-0.041 (0.046)	0.018 (0.044)
Region Dummies	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes
Fixed Effects	--	yes	--	--	--
First Difference	--	--	yes	yes	yes
Observations	68,543	68,543	47,475	43,318	31,136

Notes: Robust standard errors are in parentheses. In Columns (1) and (2), the last dollar log tax price is instrumented with the first dollar log tax price. In Columns (3)-(5), the change in the last dollar log tax price is instrumented with the change in the first dollar tax price calculated using income variables from the first year of the two year difference (inflated by the CPI for the tax calculation in the later year). All specifications include a constant term.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: All Contributions, Intensive Margin - by Income Level and Number of Contributors

	Income Modally Less Than \$50K (1)	Income Modally Between \$50K and \$100K (2)	Income Modally Greater Than 100K (3)	One Contributor (4)	Two Contributors (5)
Ln(Last Dollar Tax Price)	0.012 (0.166)	-0.004 (0.232)	0.099 (0.401)	0.376 (0.296)	0.151 (0.135)
Ln(After-tax Income)	0.772*** (0.053)	0.799*** (0.068)	0.305*** (0.055)	0.609*** (0.083)	0.641*** (0.034)
Age-squared	-0.094*** (0.034)	-0.037 (0.024)	-0.049 (0.032)	0.011 (0.028)	-0.066*** (0.022)
Sex of Primary Filer	1.046* (0.575)	0.120 (0.121)	0.172* (0.090)	0.027 (0.083)	0.577* (0.300)
Itemizer	-0.019 (0.023)	0.007 (0.019)	0.074* (0.038)	0.018 (0.027)	0.003 (0.015)
Number of Children	-0.049** (0.019)	-0.030** (0.013)	0.010 (0.015)	-0.036*** (0.013)	-0.018 (0.011)
Number of Children Away From Home	0.067 (0.072)	-0.071 (0.070)	-0.037 (0.071)	0.027 (0.067)	-0.063 (0.056)
Region Dummies	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes
First Difference	yes	yes	yes	yes	yes
Observations	14,393	21,627	11,455	10,649	36,826

Notes: Robust standard errors are in parentheses. The change in the last dollar log tax price is instrumented with the change in the first dollar tax price calculated using income variables from the first year of the two year difference (inflated by the CPI for the tax calculation in the later year). All specifications include a constant term.

* significant at 10%; ** significant at 5%;

*** significant at 1%

Table 5: Intensive Margin - by Type of Contribution

	All Contributions	IRA Contribution	Contributions to Employer-based DC Plan	Contributions to 401(k) Plans	Contributions to 403(b) Plans	Contributions to SEP Plans	Contributions to 457(b) Plans	Contributions to 501(c) Plans	Contributions to Simple Plans
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln(Last Dollar Tax Price)	0.107 (0.123)	0.540 (0.535)	0.050 (0.122)	0.094 (0.132)	-0.398 (0.346)	-1.050 (2.305)	-0.318 (0.637)	27.454 (56.265)	-0.040 (0.749)
Ln(After-tax Income)	0.628*** (0.031)	0.156* (0.091)	0.656*** (0.032)	0.677*** (0.036)	0.436*** (0.097)	0.210 (0.339)	0.467*** (0.152)	12.065 (25.143)	0.333*** (0.109)
Age-squared	-0.067*** (0.018)	0.067 (0.077)	-0.071*** (0.018)	-0.092*** (0.020)	-0.050 (0.054)	0.174 (0.254)	0.026 (0.075)	1.326 (3.933)	0.053 (0.141)
Sex of Primary Filer	0.415* (0.215)	0.000 (0.000)	0.420* (0.216)	0.305* (0.177)	1.325*** (0.020)	0.000 (0.000)	0.041 (0.044)	0.000 (0.000)	-0.005 (0.539)
Itemizer	0.011 (0.014)	0.002 (0.050)	0.002 (0.014)	0.010 (0.015)	-0.001 (0.040)	-0.086 (0.201)	-0.034 (0.043)	-0.263 (3.362)	0.031 (0.085)
Number of Children	-0.025*** (0.009)	0.004 (0.035)	-0.020** (0.009)	-0.020** (0.010)	-0.068*** (0.025)	0.138 (0.107)	-0.004 (0.031)	-0.511 (1.065)	-0.018 (0.050)
Number of Children Away From Home	-0.033 (0.045)	-0.091 (0.095)	-0.027 (0.045)	-0.035 (0.048)	0.020 (0.108)	0.000 (0.000)	-0.012 (0.076)	0.000 (0.000)	0.244 (0.175)
Region Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Fixed Effects	--	--	--	--	--	--	--	--	--
First Difference	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	47,475	2,247	45,779	37,059	6,417	207	3,350	25	994

Notes: Robust standard errors are in parentheses. The change in the last dollar log tax price is instrumented with the change in the first dollar tax price calculated using income variables from the first year of the two year difference (inflated by the CPI for the tax calculation in the later year). All specifications include a constant term.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Extensive Margin

	Eligibility Definition 1			Eligibility Definition 2	
	Contribution to Any Plan			Contributor to Any Plan	Contributor to Employer-Based Plan
	No Fixed Effects	Fixed Effects	First Difference, Base Year Instrument	First Difference, Base Year Instrument	First Difference, Base Year Instrument
	(1)	(2)	(3)	(4)	(5)
Ln(First Dollar Tax Price)	-0.116*** (0.012)	-0.018** (0.008)	-0.034 (0.024)	-0.027 (0.024)	-0.112** (0.053)
Ln(After-tax Income)	0.259*** (0.004)	0.149*** (0.003)	0.100*** (0.006)	0.103*** (0.006)	0.161*** (0.011)
Married	0.022*** (0.007)				
Age	0.009*** (0.002)	0.018*** (0.002)			
Age-squared	-0.009*** (0.003)	-0.017*** (0.003)	-0.025*** (0.005)	-0.015** (0.006)	-0.031** (0.014)
Sex of Primary Filer	0.059*** (0.006)	-0.081* (0.047)	-0.094 (0.060)	-0.092 (0.060)	-0.117 (0.094)
Itemizer	0.075*** (0.005)	0.012*** (0.004)	-0.001 (0.004)	0.000 (0.005)	-0.001 (0.007)
Number of Children	-0.041*** (0.002)	-0.009*** (0.002)	-0.005 (0.003)	-0.004 (0.003)	-0.007 (0.005)
Number of Children Away From Home	0.014 (0.024)	0.008 (0.015)	0.005 (0.015)	0.003 (0.016)	-0.006 (0.021)
Region Dummies	yes	yes	yes	yes	yes
Year Dummies	yes	yes	yes	yes	yes
Fixed Effects	--	yes	--	--	--
First Difference	--	--	yes	yes	yes
Observations	134,187	134,187	98,279	100,840	60,693

Notes: Robust standard errors are in parentheses. In Columns (1) and (2), the last dollar log tax price is instrumented with the first dollar log tax price. In Columns (3)-(5), the change in the last dollar log tax price is instrumented with the change in the first dollar tax price calculated using income variables from the first year of the two year difference (inflated by the CPI for the tax calculation in the later year). All specifications include a constant term.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Extensive Margin - by Income and Number of Eligible Contributors

Eligibility Definition and Dependent Variable	Independent Variable	Income Modally Less Than \$50K	Income Modally Between \$50K and \$100K	Income Modally Greater Than 100K	One Eligible	Two Eligible
		(1)	(2)	(3)	(4)	(5)
Eligibility Definition 1 Contribution to Any Plan	Ln(First Dollar Tax Price)	-0.019 (0.027)	-0.192** (0.093)	-0.184 (0.165)	-0.026 (0.037)	-0.034 (0.032)
	Ln(After-tax Income)	0.091*** (0.006)	0.149*** (0.021)	0.072*** (0.024)	0.107*** (0.009)	0.098*** (0.007)
Observations		52,434	32,015	13,830	48,333	49,946
Eligibility Definition 2 Contribution to Any Plan	Ln(First Dollar Tax Price)	-0.015 (0.027)	-0.110 (0.096)	-0.207 (0.178)	-0.011 (0.037)	-0.039 (0.033)
	Ln(After-tax Income)	0.090*** (0.006)	0.176*** (0.021)	0.077*** (0.025)	0.111*** (0.009)	0.098*** (0.007)
Observations		52,876	33,420	14,544	51,271	49,569
Eligibility Definition 2 Contribution to Employer-Based Plan	Ln(First Dollar Tax Price)	-0.056 (0.069)	-0.143 (0.111)	-0.248 (0.196)	0.158 (0.110)	-0.126** (0.058)
	Ln(After-tax Income)	0.191*** (0.017)	0.197*** (0.026)	0.071*** (0.026)	0.160*** (0.024)	0.165*** (0.012)
Observations		21,304	26,491	12,898	13,955	46,738

Notes: Robust standard errors are in parentheses. Each cell presents the coefficient on the first dollar log tax price (instrumented with the change in the first dollar tax price calculated using income variables from the first year of the two year difference) from a separate regression. All specifications include all control variables in previous specifications and a constant term.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Implied Effect of 2001 and 2003 Tax Changes

<u>Subsample</u>	<u>Mean Tax Price</u>			<u>Mean After-Tax Income</u>			<u>Implied Change in Contributions/ Probability of Contribution</u>		
	<u>1999</u>	<u>2005</u>	<u>% Change</u>	<u>1999</u>	<u>2005</u>	<u>% Change</u>	<u>Due to</u>	<u>Due to</u>	<u>Total</u>
							<u>Tax Price</u>	<u>After-Tax Income</u>	
<u>Contributors</u>									
All	0.718	0.738	2.7%	\$75,806	\$78,267	3.2%	0.0%	2.0%	2.0%
Income Modally Less Than \$50K	0.793	0.789	-0.5%	\$33,382	\$34,275	2.7%	0.0%	2.1%	2.1%
Income Modally Between \$50K and \$100K	0.710	0.746	5.0%	\$62,017	\$63,660	2.6%	0.0%	2.1%	2.1%
Income Modally Greater Than 100K	0.634	0.657	3.6%	\$156,079	\$162,049	3.8%	0.0%	1.2%	1.2%
<u>Eligible to Contribute by Definition 2</u>									
All	0.777	0.778	0.1%	\$54,328	\$56,047	3.2%	0.0%	0.6%	0.6%
Income Modally Less Than \$50K	0.847	0.825	-2.6%	\$25,324	\$26,044	2.8%	1.0%	6.4%	7.4%
Income Modally Between \$50K and \$100K	0.719	0.750	4.3%	\$59,698	\$61,300	2.7%	-1.4%	1.4%	0.0%
Income Modally Greater Than 100K	0.637	0.659	3.5%	\$153,147	\$158,910	3.8%	-1.0%	0.4%	-0.6%

Notes: Sample was cut to include taxpayers who were present in sample in 1999, and who were eligible to contribute under eligibility definition 2. Tax prices and after-tax incomes are calculated given income and other tax-relevant characteristics in 1999 under tax law in either 1999 or 2005. To calculate the effect of the change in the tax price, wrongly signed coefficients were set to 0.