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Taxes, Income, and Retirement Savings: Differences by Permanent and Transitory Income

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Abstract. This paper examines the determinants of and benefits from saving for retirement in tax-preferred accounts by income level, making a distinction between those who have temporarily low (or high) income and those who have persistently low (or high) income. Using a panel of tax returns that spans 1987-2006, we find that both permanently higher income and transitorily higher income are associated with a greater probability to contribute to a tax-preferred account and larger contributions. We also find that tax benefits for retirement savings increase strongly with income, though the increase is slightly smaller when taxpayers are ranked by their permanent income instead of their income in a particular year. Finally, we find that recent policy changes aimed at rewarding retirement savings among low-income households significantly increased contributions among those households, though the effect was centered among those with only transitorily low income.

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1. Introduction

The income tax code in the United States contains numerous provisions that provide tax benefits for savings in qualified retirement accounts, and the use of these accounts is widespread. In 2009, assets in Individual Retirement Accounts (IRAs) and 401(k)-type defined contribution accounts amounted to $7.6 trillion, far exceeding the $2.1 trillion in assets held in defined benefit plans.[1] In 2007, 31.6 percent of all families owned some form of IRA[2], and 33.5 percent of families participated in an employer-based defined contribution plan.[3] Correspondingly, the cost to the government in foregone revenue due to these savings incentives is quite large, with the tax expenditure on 401(k) plans, IRAs, and retirement plans for the self-employed exceeding $70 billion in 2009.[4] However, many policymakers and researchers have expressed doubts that, given this system, low-income households are saving enough for retirement, and much of the literature suggests that households with low income are less likely to contribute to or benefit from tax-preferred accounts.

In this paper, we use data from a large panel of tax returns to examine tax-preferred retirement savings behavior by income level, making a distinction between those who have temporarily low (or high) income and those who have persistently low income. We first examine the impact of income on whether and how much taxpayers contribute to tax-preferred retirement savings accounts, and find that both higher permanent income and transitorily higher income are associated with a greater probability to contribute to a

[1] Board of Governors of the Federal Reserve System (2010), p. 104.
[2] Including regular, rollover, and Roth IRAs. See Copeland (2006), p. 11.
[3] See Copeland (2009), p. 7.
[4] See Office of Management and Budget (2009), p. 301.

tax-preferred account and a larger amount contributed. We then study the extent to which the amount of tax benefits received for retirement savings differs by income, and find that tax benefits for retirement savings increase strongly with income, though the increase is slightly smaller when taxpayers are ranked by their permanent income instead of their income in a particular year (which we will refer to as current income). Finally, we examine whether recent policy changes that were intended to reward retirement savings by low-income household have increased contributions to tax-preferred retirement accounts among those households, and find that the introduction of the Saver's Credit (and, in some specifications, the exclusion of contributions to employer-based retirement accounts from Earned Income Tax Credit earnings) led to significant increases in the probability that low-income households contributed and the amount contributed, though this increase was larger among those whose income was only temporarily low enough to qualify for the Saver's Credit.

The topic of whether Americans save enough to finance their years of retirement has led to a voluminous literature in economics.[5] Some recent studies have found that low-income households are less likely to be saving adequately for retirement. For example, Engen, Gale and Uccello (1999) simulate a distribution of optimal wealth-income ratios for respondents to the 1992 Health and Retirement Survey (HRS), and find that lower earnings groups are less likely to have wealth-earnings ratios above the median than those with higher income. Scholz, Seshadri and Khitatrakun (2006) also use HRS data, and find that more than 20 percent of the bottom three earnings deciles have wealth below their simulated optimal levels, though the median deficits for these groups are

[5] For a recent survey of the literature on the adequacy of retirement savings, see U.S. Congressional Budget Office (2003).

below $6,000. In addition, they find that it is not low income per se, but rather being single (which is correlated with low income) that has a significant effect on having a wealth deficit.

Because low-income households may be more likely to reach retirement with inadequate savings, a recent aim of policy toward retirement savings has been to encourage savings among these households. In 2002, the Saver's Credit was introduced and the definition of EITC earnings was changed to exclude contributions to employer-based retirement accounts, both of which provide additional benefits to lower income taxpayers who contribute to tax-preferred retirement accounts. Three recent studies have attempted to examine whether higher Saver's Credit rates are associated with higher rates of contribution, and the results are mixed. In an experiment conducted with H&R Block that was structured to be similar to the Saver's Credit, Duflo et al. (2006) find that contributions to an H&R Block IRA product increased significantly with the presence of a match and a higher match rate, with match rates of zero, twenty percent and fifty percent associated with take-up rates of 3 percent, 8 percent and 14 percent. However, using H&R Block tax return data from 2005, Duflo et al. (2006) and Duflo et al. (2007) find that take-up and contributions increased only slightly with the actual Saver's Credit rate, with an increase from 25 percent to 100 percent yielding only a 1.3 percentage point increase in take-up, and Ramnath (2009) finds no significant effect of the credit rate on contributions using public use tax return data. To our knowledge, no study has examined the effect of the introduction of the Saver's Credit on the propensity to contribute to retirement savings among low income taxpayers. Nevertheless, several analysts have

suggested further expansions to the Saver's Credit,[6] and the President's FY2010 Budget[7] contains two proposals aimed at increasing retirement savings among lower income taxpayers, including an expansion of the Saver's Credit.

There is substantial debate over whether and how much the availability of tax-preferred retirement affects the savings rates of households. Several papers (surveyed in Poterba, Venti and Wise (1996)) found that these plans tend to increase savings among plan participants, whereas other authors (surveyed in Engen, Gale and Scholz (1996)) 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).[8] However, results in Engen and Gale (2000) and Chernozhukov and Hansen (2004) suggest that 401(k) accounts do increase wealth among those with low earnings or assets, respectively.

Thus, to the extent that low-income households do not have enough assets for retirement, one reason could be low participation and contribution rates among low income households in tax-preferred retirement accounts. A number of papers (Collins and Wykoff (1988), Bassett et al. (1998), Long (1990), Joulfaian and Richardson (2001), Munnell et al. (2001/2), Dworak-Fisher (2005)) have used cross-sectional datasets to estimate models of participation in or contributions to tax-preferred retirement accounts as a function of income, and have found that participation increases with income.[9]

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[6] See, for example, Gale, Iwry and Orsag (2004), Gale Iwry and Orszag (2005), and Gale, Gruber, and Orszag (2006).

[7] See Office of Management and Budget (2009).

[8] More recently, Benjamin (2003) finds positive but smaller effects of 401(k) eligibility on savings using propensity score matching, while Gelber (2009) finds that savings increase substantially when workers who were not initially eligible to participate in an employer's 401(k) plan become eligible.

[9] Englehardt and Kumar (2007), who find a negative effect of virtual full income using Health and Retirement Survey data, is an exception. However, the authors note that the magnitude of the estimated coefficient is small.

Consistent with this evidence, Burman et al. (2004) estimate that when households are grouped by current cash income, only two percent of the lowest cash income quintile received some tax benefit from a tax-preferred retirement savings account with an average benefit of only $6, while 61 percent of the top income quintile received some benefit with an average benefit of $1,838. The benefits of the Saver's Credit were spread somewhat more widely, though only 1.2 percent of the lowest quintile benefited. The second through fourth quintiles received the bulk of the benefit, with 7.1-9.1 percent benefiting in each of these groups, and average benefits between $20 and $26.

A common thread throughout the studies estimating the effect of income on tax-preferred retirement account usage is the use of an annual measure of income to either estimate the determinants of contribution or to categorize benefits. However, results derived using an annual measure of earnings may yield a misleading picture of whether lower income households, measured on a more comprehensive lifetime basis, differ in their propensity to use such accounts or differ in the benefits derived from the preferences for retirement savings in the tax code. Simple lifecycle consumption theory suggests that people should save when transitory income is positive and dissave when transitory income is negative, which would generate a positive impact of current income on the propensity to contribute or the amount contributed, even if there was no difference across households with different permanent incomes. On the other hand, Dynan, Skinner and Zeldes (2004) simulate a number of lifecycle savings models, and find that differences in time preference rates, bequest motives, and income and medical expense uncertainty paired with a consumption floor can yield savings rates that differ across lifetime income groups. Further, using data from the CEX, PSID, and SCF, they find that savings rates

tend to increase with lifetime income, so part of the effect of income found in the cross-sectional studies may reflect differences in the propensity to contribute to tax-preferred accounts across lifetime income groups.[10]

In this paper, then, we first examine whether higher permanent income taxpayers are more likely to save in tax-deferred accounts and to save more in such accounts, or whether previous results were a reflection of taxpayers saving in years when income was transitorily high. Using a panel of tax returns that span 1987-2006, we estimate each taxpayer's permanent income profile using fitted values from a fixed effect regression. We then decompose the effect of income on contributing to tax-preferred accounts into the effect of permanent and transitory components of income. We next examine whether the distribution of tax benefits for retirement savings change markedly when taxpayers are ranked according to their permanent income instead of their current income. We also examine the extent to which the distribution of incentives in and benefits from the Saver's Credit differ depending on what measure of income is used for the calculation of the credit. Finally, we use difference-in-differences models to estimate whether the 2002 Saver's Credit and EITC policy changes led an increase in the propensity to contribute and the amount contributed among low income taxpayers, and whether the response was concentrated among those with permanent income higher than the Saver's Credit thresholds but with current income low enough to qualify for these benefits.

The paper proceeds as follows. In Section 2, we review the incentives in the tax code for saving in tax-preferred retirement accounts. Section 3 describes the data used,

[10] Heim (2009) uses a 1999-2005 panel of tax returns to estimate the probability of contributing to a tax-deferred account (or the amount contributed) as a function of tax rates and income. Since he includes fixed effects, his specifications essentially control for lifetime income, and he finds that the coefficient on income (which may be interpreted as a transitory income coefficient) is significant. However, no effort is made to examine whether contributing behavior differs with lifetime income.

and presents estimates from the regression that is used to impute a permanent income profile to each taxpayer. In Section 4, we estimate the effect of income on contributing behavior, both in total and decomposed into permanent and transitory components. Section 5 presents the distribution of tax benefits ranked by current and permanent income, and Section 6 presents estimates of the effect of the 2002 policy changes on the contribution behavior of low-income taxpayers. Section 7 concludes.

2. Tax Policy and Retirement Savings

Tax-preferred retirement accounts come in three different forms. Employer-based accounts (including 401(k), 403(b), 457(b), SIMPLE, Simplified Employee Pensions (SEPs), and other plans) must be established by an employer.[11] The employee may then make contributions to their account, generally through payroll deductions, subject to annual limits.[12] In addition, employers often make matching contributions to an employee's account, generally figured as a percentage of the employee's contributions. Contributions to these accounts are generally deductible, and distributions are taxable. In addition, distributions before a certain age are subject to an additional 10% penalty (with some exceptions).[13]

Self-employed taxpayers may make contributions to two types of plans: Simplified

[11] 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.

[12] 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).

[13] As part of the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA2001), employers were allowed to give their employees the option of electing Roth treatment for their 401(k) or 403(b) contributions. This provision was originally scheduled to sunset in 2011, but the Pension Protection Act of 2006 made the Roth 401(k) and 403(b) provision permanent. In 2006, only a small percentage of employers allowed their employes to elect Roth treatment, and in our data for 2006, we do not observe any taxpayers making Roth 401(k) or Roth 403(b) contributions.

Employee Pensions (SEPs) and qualified (Keogh) plans. In an SEP, self-employed taxpayers are able to contribute and deduct up to a certain percentage of compensation or a fixed dollar amount, whichever is lower,[14] and distributions at retirement are taxable. Qualified (Keogh) plans must satisfy a number of different rules, including minimum coverage rules, minimum vesting rules, and nondiscrimination rules. A Keogh plan can either be a defined benefit plan or a defined contribution plan, and each type of plan has a different contribution limit. In either type of plan, however, contributions are generally deductible and distributions are taxable.

Finally, Individual Retirement Accounts (IRAs) 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.[15] Like employer-based and self-employed plan contributions, distributions from the plan (including initial contributions and any account earnings) are taxable. In a Roth IRA, on the other hand, contributions are not deductible, but account earnings accumulate tax free, and distributions are not taxable.

To encourage the use of these tax-preferred savings accounts among low and moderate income taxpayers, The Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) included two policy changes that increased the benefits of contributing to a tax-preferred retirement savings for these taxpayers. First, EGTRRA established a

[14] In 2008, these limits were 20% of self-employment income (or 25% of compensation if the self-employed taxpayer is an employee of his own corporation), up to $46,000.
[15] In 2008, for taxpayers with covered by an employer-based plan, the deduction is phased out between $53,000 and $63,000 of AGI for single and head of household filers and between $85,000 and $105,000 for married filing jointly.

non-refundable tax-credit for low and moderate income filers known as the Saver's Credit.[16] The Saver's Credit provides a tax credit for contributions to qualified retirement savings, including employer-based plans, self-employed 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 (AGI) and filing status of the taxpayer, with lower rates applying to taxpayers with higher AGI.

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.[17] 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.[18]

More recently, the President's FY2010 Budget[19] contains two proposals aimed at increasing retirement savings among lower income taxpayers. The first proposal, an expansion of the Saver's Credit, would replace the 50-20-10 percent rate structure of with

[16] 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.
[17] 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.
[18] 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.
[19] See Office of Management and Budget (2009).

a flat 50 percent rate, and the credit would be made refundable so that taxpayers who owe no tax could claim it. However, the amount of contributions eligible for the credit would be reduced from $2,000 per individual to $500 per individual. Under the second proposal, employers with 10 or more employees would be required to automatically enroll employees who are not eligible for a retirement plan in a payroll-deduction IRA, unless the employee opts out.

3. Empirical Strategy and Data

To infer the extent to which permanent and transitory income affect contributions to the tax-preferred accounts described above as well as the benefits received from these accounts, we must decompose the income amounts reported on tax forms into permanent and transitory components. To do this, we adapt strategies used in Altonji and Doraszelski (2005) and Dynan, Skinner and Zeldes (2004). To infer permanent income, Altonji and Doraszelski (2005) regressed the level or log of individual income against a vector of demographic characteristics including a polynomial in age, marital status, an indicator for children, the number of children, a set of year dummies, and household specific fixed effects. Their measure of permanent income was the individual specific fixed effect. Dynan, Skinner and Zeldes (2004) regress current income against one of four instruments for permanent income (consumption, lagged labor income, future labor income, and education) and indicator variables for age, and use the fitted values from this regression to assign households to quantiles of permanent income.

We use an approach that is a hybrid of these two methods. We perform a regression

of the form

$$(1) \qquad \ln Y_{it} = \beta X_{it} + v_i + \varepsilon_{it}$$

where Y_{it} denotes the income of the taxpayer in year t. The vector X_{it} includes a full set of interactions between indicator variables for age, marital status, and the presence of children,[20] indicator variables for the number of children (up to 5), indicator variables for census division, and year indicator variables. Finally, v_i denotes a fixed effect at the taxpayer-marital status combination level,[21] and ε_{it} denotes an i.i.d. error term. We use the fitted values from this regression, including the individual level fixed effect,[22] as a prediction of the taxpayer's permanent income in that year of observation.[23] As such, the estimated coefficients trace out a log permanent income trajectory for each taxpayer in our sample, and the difference between log current income and log permanent income in each year is the transitory part of income for that taxpayer. In some specifications, we also use predictions of log permanent income at a fixed age (40 years old). To infer this measure of permanent income, we use fitted values from the regression when all indicator variables, except that for age 40 combined with the taxpayer's marital status and presence of children status, are set to zero.

We then use these permanent and transitory income imputations for two purposes. First, we include imputations of permanent and transitory income in regressions of participation in tax-preferred retirement accounts and the amount contributed to tax-

[20] In other words, a set of age dummies for those who are single without children, a set of age dummies for those who are single with children, a set of age dummies for those who are married without children, and a set of age dummies for those who are married with children.
[21] If a primary taxpayer gets married or divorced, we treat the years before the marital status change as one unit of observation, and the years after the marital status change as a different unit of observation.
[22] Fitted values for fixed effects are calculated as the mean of the residuals.
[23] Implicit in this method is the assumption that we observe the taxpayer for a sufficient number of years such that the mean of the transitory shocks to income is zero.

preferred retirement accounts, to examine the extent to which contributing behavior responds to permanent and transitory components of income. Second, we use them to divide taxpayers into income quintiles, and to groups that do and do not benefit from the Saver's Credit, to examine the extent to which the distribution of tax benefits and incentives (which are based on current measures of income) differ when people are grouped by levels of permanent income.

To perform the imputation of permanent income, and for the subsequent analysis, we use data from a twenty year panel of tax returns that spans the years 1987-2006. This panel includes all primary filers whose social security number ends in one of two four-digit combinations, and is known as the Continuous Work History Subsample (CWHS). To create this panel, we merged returns from an existing panel, known as the 1987-96 Family Panel, with returns from cross-sectional files from 1997-2006. Each of these sources of data is described in turn.

The 1987-96 Family Panel was collected by the Statistics of Income (SOI) division of the IRS, and started with a stratified random sample of taxpayers who filed in 1987. The 1987 stratified random sample consisted of two parts: the CWHS subsample and a high income oversample. Over the following nine years, any return filed that reported any panel member as a primary or secondary taxpayer were included in the sample, including tax returns filed by panel members who were dependents of another taxpayer. To keep the panel representative of the tax filing population in subsequent years, tax returns in which the primary filer's social security number ended in one of the two four-digit CWHS endings who filed some time between 1988 through 1996 but who were not filers in 1987 were added to the panel. In addition to information from each taxpayer's Form

1040, the dataset includes information on age and gender of the primary and secondary filers, information on wages and contributions to employer-based retirement plans from W-2 forms, and information on contributions to tax-preferred savings accounts from form 5498. [24]

The 1997-2006 data come from yearly cross-sections that are collected by SOI. Like the 1987 sample described above, in each of these years a stratified random sample was collected consisting of a strictly random sample based on the last four digits of the primary filer's SSN and a high income oversample. Over these years, the size of the strictly random sample grew – consisting of two four-digit endings in 1997, five endings from 1998-2005, and ten endings starting in 2006. Each cross-section contains information from the taxpayer's Form 1040 and a number of other forms and schedules. To this data, we merged in information on age and gender of the primary and secondary filers, information on wages and contributions to employer-based retirement plans from W-2 forms, and information on contributions to tax-preferred savings accounts from Form 5498.

In our estimation sample, we include returns where the primary filer's SSN had one of the two original four-digit CWHS endings from either of these two data sources.[25] The resulting dataset consists of a one-in-5,000 random sample of taxpayers followed over 1987-2006. The panel is not balanced, and so some taxpayers drop out of the sample due to death, emigration, or falling below the tax filing thresholds, while others enter because

[24] For more information on the Family Panel, see Cilke, et al. (1999, 2000).
[25] Unfortunately, returns from the Family Panel's high income oversample were not necessarily collected after 1996. In addition, because of the sampling scheme for the yearly cross-sections, those whose incomes stayed the same or increased to a higher sampling strata would be included in a subsequent year, while those whose income decreased may have been dropped from the sample. Because of this non-random sample selection in subsequent years, where the selection depends on one of our variables of interest, we cut these returns from our sample.

of immigration or becoming filers.

To focus on people in their prime earning years, we cut the sample to include only those tax units in which the primary filer (and the secondary filer, if married filing jointly) are between the ages of 25 and 60, inclusive. We cut any observation with a filing status of married filing separately or widow(er). We also cut any observation who reported a residence outside of the United States. We then excluded observations who reported less than $1,000 in the sum of total income reported on Form 1040 and retirement contributions that are not included in total income.[26] Finally, to ensure that each taxpayer-marital status combination has a sufficient number of observations to infer permanent income without it being unduly influenced by transitory income shocks, we exclude taxpayer-marital-statuses that are observed fewer than four times. The final sample consists of 265,898 returns from 24,937 different taxpayer-marital-status combinations.

For our imputations of permanent income, the dependent variable in the regression is the log of current income, where current income comprises the sum in a particular year of total income from the relevant line on Form 1040 with retirement contributions that are not included in total income. As noted above, the dependent variables include indictor variables for marital status-presence of children-age interactions, indicator variables for number of children (up to 5), indicator variables for census division, year indicator variables, and taxpayer-marital status specific fixed effects. The resulting coefficients from this regression are presented in Appendix Table 1. Estimated age-income profiles follow a hump shape for all marital status and presence of children combinations, with income peaking somewhere between age 40 and 50, and declining thereafter. More

[26] This same income cut is used in Dynan, Skinner, and Zeldes (2004).

children are associated with higher levels of income, as is living in the northeast and the west. Finally, coefficients on the year indicator variables are generally increasing, reflecting increasing levels of real income across time.

In this study, we examine three kinds of benefits that the tax code allows for contributions to retirement accounts: the benefit from deferral of taxation under employer-based plans and traditional IRAs (or the exclusion of account earnings from taxation for Roth IRAs), the Saver's Credit, and the tax benefit from the change in the definition of earned income for EITC purposes. Calculations of each of these are described in turn.

To measure the exact tax benefit from contributing, one would need to know the rate of return on the contribution to the account, how long it was held, the manner in which it was withdrawn, the marginal tax rates for the taxpayer at contribution and withdrawal, and the marginal tax rates that the taxpayer would have faced had the funds been held in a taxable account. Since much of this information is either not contained in the tax data or only known on an ex-post basis, following Burman et al. (2004) we calculate a proxy for the tax benefit under some simplifying assumptions. We assume that the interest rate and the discount rate are 6%, and that the marginal tax rate[27] is constant at the rate from the year in which the contribution is made until the year in which the contribution is withdrawn.[28] We assume that contributions to tax-preferred accounts are held until age 65, at which time they are withdrawn. Finally, we assume

[27] All calculations of marginal tax rates and taxes owed were performed using tax calculators provided by Jon Bakija. (See Bakija (2009).) Marginal tax rates in this study include federal ordinary income tax rates, EITC credit rates, and capital gains tax rates. Tax rates were calculated by incrementing adjustments to income by $100 and calculating the marginal decrease in taxes owed.

[28] Under these assumptions, a contribution to a traditional IRA has the same present value of taxes paid as a contribution to a Roth IRA, and will have the same net balance when withdrawn.

that contributions to taxable accounts are held in an interest bearing account, the interest is taxed at ordinary income tax rates each year, and the taxes are paid out of the account balance.[29] Under these assumptions, we calculated the tax benefit as the present discounted value of the stream of taxes paid when the contribution is made to a taxable account minus the taxes paid if the contribution were made to a tax-preferred account.

Benefits from the Saver's Credit are simply the amount of Saver's Credit claimed on the taxpayer's Form 1040. Benefits from the change in the calculation of earned income for EITC purposes were calculated by first calculating the EITC to which the taxpayer was entitled under the pre-2002 rules, in which retirement savings contributions were included in earned income, then calculating the taxpayer's EITC under the rules that applied starting in 2002, in which retirement savings contributions were not included in earned income, and taking the difference. These two benefits are only calculated for returns from the years to which they applied, 2002 through 2006.

Table 1 presents sample statics from the estimation sample. Out of the 265,898 observations over the twenty years, 39.4 percent contributed to any retirement plan. Most of these taxpayers (34.5 percent of the sample) contributed to an employer-based plan, while less than 5 percent of the sample contributed to a plan for the self-employed or a traditional or Roth IRA. Among those who contributed, the average contribution was $4,090. The mean contribution among those contributing to a self-employed plan was considerably higher, at $11,081, while the mean contribution to an employer-based plan was $3,749, and the mean contributions to traditional and Roth IRAs were $2,397 and $3,351, respectively.

[29] We also calculated the tax benefits under the assumption that contributions are held in a stock account until age 65, at which time the gain is subject to capital gains taxes.

Looking next at the benefits of contributing, almost all of those who contributed (38.4 percent of the sample) received some type of benefit. Thirty eight percent received a tax benefit from contributing to a tax-preferred account, and among those who benefitted, the average benefit was $774. On the other hand, only 5.2 percent of returns from 2002-2006 received the Saver's Credit (with an average benefit of $170), and 2.6 percent benefitted from the change in EITC earnings rules (with an average benefit of $147). The mean log current income and log permanent income in the sample are both 10.476, while the medians of current income and permanent income are $38,053 and $36,698, respectively.

Table 2 presents the distribution of the sample by quintile of current income and permanent income, as well as the fraction contributing and mean amount contributed (among those contributing) for each of these groups. Since policy changes (including changes in contribution limits, the introduction of the Saver's Credit and the EITC policy change) may affect contributing behavior, to keep the policy environment more stable we only include returns from 2002 through 2006 in this table.

Panel A presents the distribution of observations in the sample. Most of the sample (68 percent) have current income and permanent income that fall into the same quintile, but 16.3 percent of the sample has permanent income that falls in a lower quintile (predominantly one quintile lower) than their current income, and 15.7 percent have permanent income that falls in a higher quintile (predominantly one quintile higher). Panel B presents the propensity to contribute to a tax-preferred account by current and permanent income quintile. In this table, overall and within a particular permanent or current income quintile, the probability of contributing generally increases as both the

current income quintile and the permanent income quintile increase. It also appears that a transitory shock to income has asymmetric effects, with a larger effect for negative shocks than for positive shocks. For example, for the middle permanent income quintile, if current income is also in the middle quintile, the probability of contributing is 0.463. If the taxpayer has received a negative transitory shock such that current income is in the first quintile, the probability of contributing drops to 0.160, while if the taxpayer has a positive shock raising them to the top quintile the probability of contributing only increases to 0.569. Panel C presents the mean amount contributed among those that contribute. Again, overall and within a particular permanent or current income quintile, contributions increase both as the current income quintile and the permanent income quintile increase. Here, a positive transitory shock to income appears to have more of an effect when the shock is positive. Within the middle permanent income quintile, a transitory income shock that raises current income from the middle to the fifth quintile increases the mean contribution from $2,242 to $6,418, while a negative shock that drops current income into the first quintile decreases the mean contribution to $1,684.

4. Effect of Income on Contributions

In Table 3, we examine whether changes in current income affect contributing behavior in a different manner than changes in permanent income. To do so, we initially estimate the effect of current income on tax-preferred account contributions using a

method that is similar to what was estimated in the papers cited above.[30] We use regressions of the form

$$(2) \qquad D_i^* = \alpha_1 \ln Y_i + \beta_1 X_i + \varepsilon_{1i}, \quad D_i = 1\left(D_i^* > 0\right),$$

$$(3) \qquad \ln C_i = \alpha_2 \ln Y_i + \beta_2 X_i + \varepsilon_i \quad \text{conditional on } D_i = 1$$

where D_i is one if a contribution was made to any type of tax-preferred account (including employer-based, self-employed, and traditional and Roth IRAs) and zero otherwise, C_i denotes the total amount of contributions to all types of accounts, Y_i denotes current income, X_i denotes demographic characteristics including age and age squared, the number of children at home and away from home, and indicator variables for the sex of the primary filer, marital status, and census division. Equation (2) estimates the determinants of the propensity to contribute any amount to a tax-preferred account and is estimated using a probit, while Equation (3) estimates the determinants of the amount contributed conditional on contributing and is estimated using OLS.[31] For both of these equations, we use returns from 2006.[32] In Column 1 of Table 3, we present the average marginal effects from the probit estimation of making a contribution, and in Column 5 we present the coefficients from the amount regression. Consistent with previous studies, we find that current income is strongly significantly associated with both contributing to a tax-preferred account and the amount contributed, with a one percent increase in current income associated with a .264 percentage point increase in the probability to contribute,

[30] This specification is most similar to that in Joulfaian and Richardson (2001), who examine the determinants of contributions to any type of tax-preferred account.
[31] A selection corrected regression would clearly be preferred for the amount contributed specification. Unfortunately, the tax data do not contain any variables that could plausibly be thought of as affecting the propensity to contribute but not the amount, so identification of the inverse mills ratio would rely on functional form assumptions. So, we resort to estimating a conditional amount contributed specification.
[32] We also estimated all of the equations in this section using returns from 1990 or 2000 in place of the 2006 returns. The results were qualitatively similar.

and a 1.113 percent increase in the amount contributed.

However, including current income confounds the effect of permanent income levels with the effect of transitory shocks to income. To examine whether breaking current income into permanent and transitory components has an effect on the estimates, we decompose the log of current income into two parts

(4) $$\ln Y_i = \ln Y_i^P + \left(\ln Y_i - \ln Y_i^P\right)$$

Where $\ln Y_i^P$ denotes the taxpayer's imputed value of log permanent income in 2006 given their age in 2006. The first term captures the predictable portion of income given their current age, and the second term (which we will refer to as the current income log difference) captures the transitory portion of income. We then estimate the equations

(5) $$D_i^* = \alpha_1^P \ln Y_i^P + \alpha_1^T \left(\ln Y_i - \ln Y_i^P\right) + \beta_1 X_i + \varepsilon_{1i}, \quad D_i = 1\left(D_i^* > 0\right),$$

(6) $$\ln C_i = \alpha_2^P \ln Y_i^P + \alpha_2^T \left(\ln Y_i - \ln Y_i^P\right) + \beta_2 X_i + \varepsilon_i \quad \text{conditional on } D_i = 1$$

These results are presented in Columns (2) and (6). In this specification, both the permanent and transitory parts of income are associated with a higher propensity to contribute and larger contributions. In addition, contrary to what one would expect under the permanent income hypothesis, the permanent portion of income is associated with a larger increase in the propensity to contribute than is the transitory part of income. A one percent increase in permanent income (holding the current income log difference constant) is associated with a 0.289 percentage point increase in the probability of contributing and a 1.240 percent increase in the amount contributed, while a one percent increase in current income (holding permanent income constant) is associated with a 0.194 percent point increase in the probability of contributing and a 0.784 percent increase in the amount contributed. These results are consistent with results in Dynan,

Skinner and Zeldes (2004), who find that households with higher permanent income save more, since we find taxpayers with higher permanent income are more likely to save and save more in tax-preferred retirement accounts. Interestingly, the effects of permanent income on contributing appear to be larger than the effects of transitory income.

The coefficients on permanent income in Columns (2) and (6) still confound two types of changes to permanent income. To impute permanent income, we estimated taxpayer specific income-age profiles, and so permanent income varies both across taxpayers and across different ages within each taxpayer. As a result, permanent income could be higher because a taxpayer's entire income profile is higher, or could be higher because the taxpayer is at an age with a higher point on a given income profile. To disentangle these two effects, we decompose income as

$$(7) \qquad \ln Y_i = \ln Y_i^{P40} + \left(\ln Y_i^{P} - \ln Y_i^{P40}\right) + \left(\ln Y_i - \ln Y_i^{P}\right)$$

where $\ln Y_i^{P40}$ denotes the amount that the imputed value of log permanent income for each taxpayer in 2006 would be if they were age 40. This amount is calculated using the fitted values from the income regression when the interaction between age 40 and the taxpayer's marital status and presence of children are set to one, and all other age-marital status-children interactions are set to zero. The first term captures the unchanging differences across taxpayers in permanent income, the second term (which will be denoted the permanent income log difference) captures movement along a particular taxpayer's permanent income profile, and the third term again captures the transitory portion of income. We then estimate the equations

$$(8) \qquad D_i^* = \alpha_1^{P40} \ln Y_i^{P40} + \alpha_1^{P}\left(\ln Y_i^{P} - \ln Y_i^{P40}\right) + \alpha_1^{T}\left(\ln Y_i - \ln Y_i^{P}\right) + \beta_1 X_i + \varepsilon_{1i},$$

$$D_i = 1\left(D_i^* > 0\right)$$

(9) $$\ln C_i = \alpha_2^{P40} \ln Y_i^{P40} + \alpha_2^{P}\left(\ln Y_i^{P} - \ln Y_i^{P40}\right) + \alpha_2^{T}\left(\ln Y_i - \ln Y_i^{P}\right) + \beta_2 X_i + \varepsilon_i$$

conditional on $D_i = 1$

These results are presented in Columns (3) and (7). In this specification, a higher permanent income profile, increases along a particular permanent income profile and transitory income are all associated with higher probabilities of contributing and amounts contributed. A one percent increase in permanent income at age 40 (holding the permanent and current income log differences constant) is associated with a 0.290 percentage point increase in the probability of contributing and a 1.241 percent increase in the amount contributed, a one percent increase in permanent income (holding permanent income at age 40 and the current income log difference constant) is associated with a 0.178 percentage point increase in the probability of contributing (though this coefficient is not insignificant) and a 1.161 percent increase in contributions, and a one percent increase in current income (holding both permanent incomes constant) is associated with a 0.194 percentage point increase in the probability of contributing and a 0.784 percent increase in the amount contributed. Similar to the specification above, transitory income is estimated to have a smaller effect than one or both of the measures of permanent income.

Given that Table 2 suggested that changes in current income may have asymmetric effects on the propensity to contribute and the amount contributed, we repeat the specifications that break income into three components (permanent income at age 40, permanent income log difference, and current income log difference), but now allow different effects for each quintile of each component. When this is done, the results above change qualitatively.

In the probit estimation of making a contribution presented in Column (4), the transitory portion of income is found to have a larger effect than the log of permanent income at age 40 for all but the highest quintiles, which suggests that all but the largest transitory shocks to income will have a larger effect on contributions than a similar sized shift in a taxpayer's entire income profile. For example, for the middle quintile of the current income log difference, the average marginal effect of the current income log difference is 0.740, while the average marginal effect of the log of permanent income at age 40 is 0.162. So, although higher permanent income taxpayers are still found to be more likely to contribute, the estimated effect is much smaller than in previous specifications. In addition, movement along an income profile appears to have an effect similar in size to the effect of a transitory income shock for the lowest three quintiles, though the average marginal effects are imprecisely estimated for higher quintiles. Finally, the average marginal effects of the current income log differences reflect the asymmetrical effect of current income found in Table 2, since the coefficients for the top two quintiles are significantly smaller than those for the bottom three.

For the amount regression in Column (8), the results are somewhat similar, in that permanent income does not clearly have a larger effect than transitory income on the amount contributed. But, the results are more mixed, in that the magnitudes are similar for some quintiles, higher for permanent income in some quintiles and higher for current income in other quintiles.

Taken together, these results suggest that higher permanent income taxpayers are more likely to contribute and to contribute larger amounts to tax-preferred retirement accounts. However, positive transitory income shocks also increase the probability of

contributing and the amount contributed, and in the specification that allowed for different effects by quintile, transitory income shocks increase contributions more than do changes in permanent income.

5. Tax Benefits by Income Level

We now turn our attention to whether the distribution of incentives and benefits for retirement savings in the tax code differs if based on permanent income instead of current income. Burman et al. (2004) found that when were grouped by current income, the bulk of tax benefits from contributions to tax-preferred retirement accounts were received by the highest income quintile, with the lowest quintile receiving a very small share of the benefits. Given our estimated values of permanent income derived above, we can examine whether these results hold when taxpayers are grouped based on their permanent income. For this purpose, in Tables 4-7 we group people into quintiles of current and permanent income and examine the fraction of each cell that benefits from a particular provision as well as the portion of total benefits received.

Table 4 presents, among 2002-2006 returns, the fraction of each current and permanent income quintile cell that benefit from the Saver's Credit, the EITC policy change, and from the deferral of taxation on contributions or the exclusion of returns from taxation, both together and separately. Overall, 43.1 percent of the sample receives some benefit from retirement savings, including 5.2 percent who benefit from the Saver's Credit, 2.6 percent who benefit from the EITC policy change, and 41.9 percent who receive some tax benefit from deferral or exclusion.

In Panel A, which combines all benefits together, when observations are grouped by current income quintile, only 5.6 percent of the bottom current income quintile received some benefit, whereas 7.3 percent of the bottom quintile of the permanent income distribution received some benefit. On the other end of the income spectrum, 77.3 percent of the top current income quintile, and 75.9 percent of the top permanent income quintile, receive some benefit. Within each permanent income quintile, the fraction receiving some benefit generally increases as current income increases, as one would expect given the contributing behavior reflected in Table 2.

In Panel B, when grouped by current income quintile, the benefits from the Saver's Credit are centered in the second and third quintiles, with 11.1 percent of the second quintile and 11.8 percent of the third quintile receiving some benefit, while only 2.4 percent of the bottom quintile receives a benefit. When observations are grouped by permanent income, on the other hand, the benefits are somewhat more spread out, with the 3.3 percent of the bottom quintile, and 9.1 percent of the second and third quintiles receiving a benefit. However, 4.7 percent of the fourth permanent income quintile received a benefit, compared to only 1.7 percent of the fourth current income quintile.

A similar pattern holds for benefits from the EITC policy change in Panel C. When grouped by current income, benefits are centered in the second quintile (with 9.1 percent benefitting), while only 2.9 percent of the bottom quintile benefits. When grouped by permanent income, the fraction of the second quintile benefitting drops to 7.2 percent, while the fraction of the bottom quintile that benefits increases to 3.3 percent.

In Panel D, the fraction receiving a tax benefit increases across current income and permanent income quintiles, with 77.3 percent of the top current income quintile

receiving a tax benefit while only 3.3 percent of the bottom current income quintile receiving a benefit. However, a slightly smaller proportion of the top quintile and a slightly larger proportion of the bottom quintile receive a benefit when observations are grouped by permanent income (75.8 percent and 5.2 percent, respectively).

Table 5 breaks out the proportion of each cell receiving a tax benefit from deferral or exclusion by the type of account. Panel A presents results for employer-based plans, Panel B for self-employed plans, Panel C for Traditional IRAs, and Panel D for Roth IRAs. Looking across these panels, only for employer-based plans is there much of a difference between the distribution by current income or by permanent income in the fraction of taxpayers benefitting, with 2.5 percent of the bottom quintile receiving a benefit when ranked by current income, and 4.4 percent receiving a benefit when ranked by permanent income.

Two other aspects of these tables are worth noting. First, the fraction of taxpayers benefitting from any of these types of plans increases with income, regardless of whether taxpayers are ranked by current and permanent income. Second, the distribution of taxpayers benefitting from traditional IRAs is less skewed toward higher incomes than for Roth IRAs, with the percent benefitting increasing from 0.4 percent of the lowest current income quintile to 4.1 percent of the highest current income quintile for traditional IRAs and from 0.6 percent to 9.7 percent for Roth IRAs.

Table 6 presents the share of benefits by current and permanent income quintile from the Saver's Credit, the EITC policy change and tax benefits of deferral or exclusion, as well as the sum of these. Panel A presents the sum of these benefits. The distribution of total benefits is only slightly less skewed by income if taxpayers are sorted by

permanent rather than current income. When grouped by current income, the lowest quintile received 0.5 percent of the total benefits and the highest quintile received 71.4 percent, whereas when grouped by permanent income the lowest quintile received 0.8 percent of the benefits and the highest quintile received 68.2.

Across the type of benefit, there is substantial variation in the distribution of benefits. For the Saver's Credit, the second and third current income quintiles received 46.0 percent and 37.5 percent of the benefits, respectively, while the bottom quintile received 8.7 percent and the fourth quintile received 7.8 percent. When grouped by permanent income, the Saver's Credit appears to be somewhat more successful at delivering benefits to the lowest quintile (with this quintile receiving 11.4 percent), but the share of benefits going to the fourth income quintile increases by an even larger amount (to 19.8 percent). On the other hand, the lowest permanent income quintile receives a much greater share (14.5 percent) of the EITC policy change benefits than does the lowest current income quintile (7.8 percent of the benefits). Finally, the share of tax benefits from deferral or exclusion is slightly less skewed toward higher incomes when grouped by permanent income rather than current income, with the lowest quintile receiving 0.2 percent of the benefits when grouped by current income and 0.5 percent when grouped by permanent income, and the highest quintile receiving 73.7 percent of the benefits when grouped by current income and 70.4 percent of the benefits when grouped by permanent income.

Lastly, Table 7 breaks out the distribution of benefits by the type of account. Across all account types, the share of benefits going to the lower income quintiles is slightly higher, and the share going to the higher quintiles is slightly lower, when

taxpayers are grouped by permanent income. Across all types of accounts, the distribution of benefits is skewed toward higher income quintiles even when grouped by permanent income. The benefits for self-employed plans are the most skewed, in which 93.6 percent of benefits go to taxpayers in the top permanent income quintile, while benefits for traditional IRAs are the least skewed, in which the highest permanent income quintile received 44.8 percent of the benefits.

We next examine the extent to which the Saver's Credit rate would differ if the Saver's Credit were based on taxpayer's permanent income instead of current income. As mentioned above, the purpose of the Saver's Credit is to encourage savings among low-income households, and in this context low-income is generally thought to include those who are persistently low-income, rather than those who have high permanent income but who have received a large negative income shock in a particular year. However, the Saver's Credit is based on a yearly measure of income, and so the savings incentives in the Saver's Credit may go toward those with high permanent income if their current income is sufficiently low. To examine the extent to which this is the case, for 2002-2006 returns we calculate the taxpayer's Saver's Credit rate (either 50%, 20%, 10%, or 0) given their actual income and taxes owed in that year,[33] and then calculate the rate that would have applied if they had earned the predicted amount of permanent income in that year.

Panel A of Table 4 presents the distribution of returns by Saver's Credit rates based on permanent and current income. A large portion of the sample, 64.4 percent, does not qualify for the Saver's Credit under any definition of income, either because their income

[33] Because the Saver's Credit is non-refundable, a taxpayer must have positive tax liability before the Saver's Credit is calculated in order to benefit from it.

is too high or because they do not owe any tax and so cannot benefit from a nonrefundable credit. An additional 16.1 percent of the sample would qualify for the same credit rate regardless of whether the credit is based on current or permanent income. Basing the credit on current income instead of permanent income does, however, reduce the credit for 11.5 percent of the sample, while 8.0 percent of the sample qualifies for a higher rate given their permanent income. Finally, looking at the margin between qualifying for a credit and not qualifying for a credit, 6.3 percent of the sample do not qualify for the credit based on their current income but would based on their permanent income, while 4.7 percent of the sample qualify for the credit based on their current income but would not based on permanent income.

Panel B presents the share of benefits from the Saver's Credit received by each of these groups of taxpayers. When based on current income, over 53 percent of the benefits go to taxpayers in the highest AGI bracket who qualify for the 10 percent rate, while 37.7 percent of the benefits go to taxpayers in the lowest AGI bracket who qualify for the 50 percent rate. Interestingly, looking at the share of benefits by rate based on permanent income, 22.3 percent of the benefits go to taxpayers who would not qualify for a credit if it were based on permanent income. Thus, more than a fifth of the benefits from the Saver's Credit go to taxpayers whose income is only transitorily low enough to claim the credit, and if it were possible to base the Saver's Credit on permanent income, the distribution of benefits from the credit would look substantially different.

Overall, it appears the distribution of benefits by income quintile does not differ dramatically when taxpayers are ranked by permanent instead of current income, and that the general results found in Burman et al. (2004) still hold, in which higher income

taxpayers receive the bulk of benefits while the lowest income taxpayers receive a small share. However, when looking at a policy like the Saver's Credit where the aim is to target benefits to a specific group (for example, the persistently low income), examining benefit receipt based on current income can give a misleading picture of how effectively the policy is reaching its intended beneficiaries.

6. Effect of Tax Changes

We finally examine whether recent policy changes intended to encourage retirement savings among low-income taxpayers were effective in increasing contributions to tax-preferred accounts, and whether a large portion of the response occurred among those with only transitorily low income. The two policy changes we examine are the introduction of the Saver's Credit and the change in EITC earnings rules, which both occurred in 2002.[34] To do so, we employ a difference-in-differences strategy, comparing taxpayers who were affected by the policy changes to similar taxpayers who were not. We use returns from 2000-2001 as the pre-reform period, and returns from 2005-2006 as the post-reform period.[35] We then include in the estimation sample those taxpayers whose adjusted gross income (AGI) before subtracting off tax-preferred account contributions was below the income eligibility limit for the Saver's Credit given their filing status. For 2005 and 2006, these limits were $25,000 for single filers, $37,500 for

[34] During this period, marginal tax rates also changed, which affect the tax benefits of deferral or exclusion. However, these changes did not differentially affect low-income taxpayers, and so are not the focus of this study. Heim (2009) examines the effect of these marginal rate changes, and finds little sensitivity of contributions to the after-tax price of contributing to tax-deferred accounts.

[35] Use use these later years as the post period because results in Koenig and Harvey (2005) suggest that takeup was far from perfect in the early years of the credit. They estimate that 34 percent of taxpayers who qualified for the Saver's Credit did not claim it.

heads of households, and $50,000 for married taxpayers filing jointly. To identify those below the income thresholds for the 2000 and 2001 returns, we inflate 2000 AGI (before tax-preferred contributions) to 2005 levels and 2001 AGI (before tax-preferred contributions) to 2006 levels, and then indentify taxpayers whose inflated AGI amounts are below these thresholds.

For the Saver's Credit, we wish to include in the treatment group those eligible to claim the Saver's Credit in 2005-6 (or who would have been eligible to claim the credit if it existed in 2000-2001) and wish to include in the control group taxpayers who are have similar characteristics to the treatment group but who are not eligible. To do so, we exploit the fact that the Saver's Credit is non-refundable, and so only those with positive tax liability can benefit from it. Hence, for the treatment group, we include taxpayers who owed a positive amount of taxes before taking into account the Saver's Credit, and in the control group we include those who did not owe taxes.

For the EITC earnings definition change, we define the treatment group based on those who would receive a positive benefit from the change, which includes those taxpayers whose earned income falls in the phase-out range of the EITC schedule. Prior to 2002, if a taxpayer in the phase-out range earned an additional dollar, their EITC would decrease by the phase-out rate regardless of whether they took it as income or contributed it to an employer-based account. Starting in 2002, if that taxpayer contributed the dollar to a tax-preferred account, their EITC would not decrease, while if they took the dollar as income their EITC would decrease by the phase-out rate. The control group, then, includes taxpayers whose income falls either in the phase-in range, the plateau range, or above the end of the phase-out range. For these calculations, we

inflate 2000 (or 2001) nominal values to 2005 (or 2006) levels, and calculate EITC amounts for all four years of returns under pre-and post-2002 definitions of income given 2005 (or 2006) tax schedules. We then identify taxpayers whose EITC under the post-2002 definition of earned income is higher than under the pre-2002 definition as the treatment group, and those whose EITC is the same or lower as the control group.

We estimate equations of the form

$$(9) \qquad D_i^* = \sum_{j=1}^{J} \alpha_1 Treatment_{ij} + \gamma_1 Post_i + \sum_{j=1}^{J} \delta_1 Treatment_{ij} * Post_i + \beta_1 X_i + \varepsilon_{1i},$$

$$D_i = 1\left(D_i^* > 0\right)$$

$$(10) \quad C_i = \max\left(\sum_{j=1}^{J} \alpha_2 Treatment_{ij} + \gamma_2 Post_i + \sum_{j=1}^{J} \delta_2 Treatment_{ij} * Post_i + \beta_2 X_i + \varepsilon_{2i}, 0 \right)$$

where $Treatment_{ij}$ denotes that taxpayer i is in treatment group j and $Post_i$ denotes that the return comes from either 2005 or 2006. Included in X_i are age, age squared, the sex of the primary filer, the number of children at home and away from home, indicator variables for region and year, and a constant. Equation (9) is estimated by probit, and Equation (10) is estimated by Tobit.

Table 9 presents the results. The three left columns present the average marginal effect of the *Treatment*Post* interactions in specifications that estimate probit models of contributing, while the three right columns present the coefficients on the *Treatment*Post* interactions from contribution amount Tobits. In Panel A, we consider three different treatments – being eligible for the Saver's Credit but receiving no benefit from the EITC policy change, receiving a benefit from the EITC policy change but not being eligible for the Saver's Credit, and being eligible for the Saver's Credit and receiving a benefit from the EITC policy change. In the probit estimation of making a contribution, being eligible

for only the Saver's Credit is estimated to increase the probability of contributing to a tax-preferred account by a marginally significant 2.8 percentage points, while receiving a benefit from only the EITC policy change is estimated to increase the probability of contributing by 2.2 percentage points (though this coefficient is not significant). Although one would expect the group receiving both treatments to exhibit the greatest increase in contributions, the coefficient for this group is estimated to be 0.024, and is again insignificant. In the contribution Tobit, the only significant effect is again found for being eligible for the Saver's Credit alone, which is estimated to increase contributions by a statistically significant $317.

In Panel (B), we examine whether receiving a different credit rate from the Saver's Credit has differential effects on contribution behavior. To do this, we break out those that are only eligible for the Saver's Credit into those that are eligible for a 10% credit, a 20% credit, and a 50% credit. In this specification, benefitting from the EITC policy change alone and in combination with the Saver's Credit again have similar effects to Panel (A). However, among those only eligible for the Saver's Credit, only those who were eligible for the 10% credit rate significantly increase contributions, with a 3.1 percentage point increase in the probability of contributing and a $315 increase in contributions. Since the 10% rate applies to those with the highest income levels among those who are eligible, these results suggest that the response to the Saver's Credit is concentrated among moderate income taxpayers.

In Panel (C), we investigate whether the estimated response to the treatments was also concentrated among those with moderately high permanent income but whose current income was temporarily low enough to qualify for the credit. If the response to

these policies was driven by taxpayers whose income was only temporarily low, then the estimated effect for those whose permanent income is above the income threshold for the Saver's Credit would be larger than for those with permanent income below the threshold. In this panel, this appears to be the case, as the Saver's Credit is estimated to have increased the probability of contributing by 3.0 percent (and the amount contributed by $314) for taxpayers with permanent income below the Saver's Credit threshold, but by 5.3 percent (and by $492) for taxpayers with permanent income above the threshold. Similarly, benefitting from the EITC policy change is estimated to increase the probability of contributing by an insignificant 2.0 percent for taxpayers with permanent income below the threshold, but by 23.1 percent for taxpayers with income above the threshold. Both amount coefficients are insignificant, but the coefficient for those with permanent income above the threshold is substantially larger. Finally, the coefficients for those receiving both treatments follow the same pattern - larger for those with permanent income above the threshold. Although none of the differences between coefficients above and below the threshold are significant, the pattern of results is consistent with the effect of these treatments being the largest for those with higher permanent income

Thus, it appears that the Saver's Credit (and, in some specifications, the EITC policy change) increased low-income taxpayers' propensity to contribute to tax-preferred accounts and the amount contributed. However, we find that the effect of the Saver's Credit was larger eligible taxpayers with higher current income, and that the effects of both were higher for those whose income was only temporarily low enough to qualify for the Saver's Credit.

7. Conclusion

In this paper, we examined tax-preferred retirement savings behavior by income level. We used data from a large panel of tax returns to estimate taxpayer's permanent income, and used the results to distinguish the effects of low (or high) permanent income from the effects of low (or high) transitory income. We find that both higher permanent income and transitorily higher income are associated with a greater probability to contribute to a tax-preferred account and a larger amount contributed. We also find that tax benefits for retirement savings increase strongly with income, though the increase is slightly smaller when taxpayers are ranked by their permanent income instead of their current income. Finally, we find that both the introduction of the Saver's Credit and a change in the Earned Income Tax Credit in how retirement savings are treated led to significant increases in the probability that low-income households contributed and the amount contributed, though this increase was larger among those whose permanent income lay above the Saver's Credit income thresholds.

These results help to clarify the results in several papers in the literature. They imply that findings in the literature that showed that retirement contributions increase with income were not simply reflecting taxpayers increasing contributions when income is temporarily high, but also (consistent with findings in Dynan, Skinner and Zeldes (2004)) that higher permanent income taxpayers save more in tax-preferred retirement accounts. They also suggest that, consistent with Burman et al. (2004), higher income taxpayers receive the bulk of tax benefits for retirement savings, regardless of whether one considers their current or permanent income.

The Saver's Credit and the EITC policy change were found to provide benefits to lower income taxpayers and to encourage contributions to tax-preferred accounts among those that qualify. However, those who would not qualify for the Saver's Credit if it were based on permanent income received more than a fifth of the benefits from the credit, and the effect of the Saver's Credit and EITC policy change on increasing the probability of contributing and the amount of contributions appears to be concentrated among these taxpayers.

In total, these results suggest that in examining the interplay between income and the benefits from and responses to government programs, it is often important to distinguish between households with permanently low (or high) income, and those whose income is only transitorily low (or high). This is especially the case when the policy is intended to target benefits or incentives to lower-income populations. The method used in this paper provides a framework for such examinations, and could be profitably applied to many other settings. Such extensions are left for future research.

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Table 1. Sample Statistics

	Mean	Std. Dev.
Indicator for Contributing		
Any Plan	0.394	0.489
Employer-based Plan	0.345	0.475
Self-Employed Plan	0.012	0.108
Traditional IRA	0.044	0.205
Roth IRA	0.024	0.154
Amount Contributed (Among Contributers)		
Any Plan	$4,090	$4,824
Employer-based Plan	$3,749	$4,014
Self-Employed Plan	$11,081	$11,697
Traditional IRA	$2,397	$1,496
Roth IRA	$3,351	$2,402
Indicator for Receiving a Benefit		
All Benefits	0.384	0.486
Saver's Credit[1]	0.052	0.222
EITC Rule Change[1]	0.026	0.159
Tax Benefit of Deferral or Exclusion		
from all Contributions	0.380	0.485
from Employer-based Plan	0.333	0.471
from Self-Employed Plan	0.012	0.108
from Traditional IRA	0.043	0.203
from Roth IRA	0.023	0.150
Amount of Benefit (among Beneficiaries)		
All Benefits	$774	$1,019
Saver's Credit[1]	$170	$156
EITC Rule Change[1]	$147	$160
Tax Benefit of Deferral or Exclusion		
from all Contributions	$776	$1,027
from Employer-based Plan	$722	$867
from Self-Employed Plan	$2,101	$2,520
from Traditional IRA	$367	$287
from Roth IRA	$614	$495
Income Variables		
Current Income	$57,527	$195,759
Permanent Income	$52,568	$109,954
ln(Current Income)	10.476	0.944
ln(Permanent Income)	10.476	0.853
Demographic Variables		
Age	41.087	9.588
Sex of Primary Filer (1=Female)	0.267	0.443
Married	0.495	0.500
Children at Home	0.924	1.130
Children Away from Home	0.013	0.146
Region		
New England	0.052	0.221
Mid-Atlantic	0.143	0.350
East North Central	0.159	0.365
West North Central	0.069	0.253
South Atlantic	0.189	0.391
East South Central	0.060	0.238
West South Central	0.105	0.307
Mountain	0.061	0.239
Pacific	0.163	0.370
Observations	265,898	

Notes: Data from the 1987-2006 panel of CWHS tax returns.
[1]Among returns from 2002-2006 (71,372 observations).

Table 2. Sample Statistics by Current Income and Permanent Income, 2002-2006 Returns

A. Distribution of Observations

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	15.26	3.75	0.76	0.17	0.05	20.00
2	4.18	11.63	3.59	0.51	0.09	20.00
3	0.49	4.07	11.73	3.43	0.28	20.00
4	0.06	0.50	3.56	12.85	3.03	20.00
5	0.01	0.06	0.35	3.03	16.54	20.00
Total	20.00	20.00	20.00	20.00	20.00	100.00

B. Fraction with a Contribution

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.062	0.128	0.160	0.161	0.132	0.079
2	0.168	0.265	0.308	0.307	0.344	0.254
3	0.273	0.360	0.463	0.476	0.418	0.439
4	0.419	0.449	0.558	0.654	0.633	0.628
5	0.286	0.390	0.569	0.708	0.805	0.785
Total	0.091	0.264	0.442	0.618	0.770	0.437

C. Mean Conntribution Among Contrbuters

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	727	1206	1684	1674	4602	979
2	1073	1261	1534	2182	4000	1340
3	2014	1902	2242	2515	3570	2250
4	3369	4253	3474	3766	4711	3872
5	21411	3504	6418	5916	9902	9305
Total	1024	1570	2517	3950	9192	5098

Note: Data from the 1987-2006 panel of CWHS tax returns. Permanent income imputed using regression results from Table A1.

Table 3. Estimation of Participation and Amount of Contribution

	Probit of Contributing				Regression of Amount Contributed Conditional on Contributing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(A) Log of Current Income	0.264***				1.113***			
	(0.004)				(0.019)			
(B) Log of Permanent Income		0.289***				1.240***		
		(0.005)				(0.022)		
(A) - (B) Current Income Log Difference		0.194***				0.784***		
		(0.009)				(0.036)		
(C) Log of Permanent Income at Age 40			0.290***				1.241***	
			(0.005)				(0.022)	
(B) - (C) Permanent Income Log Difference			0.178				1.161***	
			(0.123)				(0.386)	
(A) - (B) Current Income Log Difference			0.194***				0.784***	
			(0.009)				(0.036)	
Log of Permanent Income at Age 40 *								
Quintile 1				0.141***				0.760***
				(0.017)				(0.055)
Quintile 2				0.154***				0.786***
				(0.016)				(0.052)
Quintile 3				0.162***				0.806***
				(0.016)				(0.049)
Quintile 4				0.168***				0.826***
				(0.015)				(0.048)
Quintile 5				0.169***				0.862***
				(0.014)				(0.045)
Permanent Income Log Difference *								
Quintile 1				0.277**				1.190***
				(0.124)				(0.394)
Quintile 2				0.451**				1.604***
				(0.178)				(0.585)
Quintile 3				0.706*				1.233
				(0.374)				(1.231)
Quintile 4				2.414**				-2.779
				(1.124)				(3.901)
Quintile 5				0.180				1.290
				(0.962)				(3.025)
Current Income Log Difference *								
Quintile 1				0.333***				0.876***
				(0.018)				(0.077)
Quintile 2				0.420***				1.488***
				(0.074)				(0.251)
Quintile 3				0.740***				0.677
				(0.204)				(0.622)
Quintile 4				0.176***				1.014***
				(0.058)				(0.183)
Quintile 5				0.053***				0.700***
				(0.017)				(0.055)
Age	0.003	0.002	0.01	0.004	0.028*	0.022	0.028	0.021
	(0.005)	(0.004)	(0.010)	(0.009)	(0.015)	(0.015)	(0.031)	(0.031)
Age Squared	-0.056	-0.047	-0.141	-0.068	-0.161	-0.101	-0.168	-0.094
	(0.051)	(0.051)	(0.115)	(0.113)	(0.174)	(0.173)	(0.368)	(0.366)
Sex of Primary Filer	0.072***	0.077***	0.076***	0.071***	-0.130***	-0.106***	-0.107***	-0.111***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.037)	(0.037)	(0.037)	(0.037)
Married	0.053***	0.028**	0.028**	0.013	-0.163***	-0.264***	-0.264***	-0.322***
	(0.011)	(0.012)	(0.012)	(0.012)	(0.038)	(0.039)	(0.039)	(0.039)
Children at Home	-0.033***	-0.032***	-0.031***	-0.031***	-0.083***	-0.086***	-0.085***	-0.086***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.014)	(0.013)	(0.014)	(0.014)
Children Away from Home	0.037	0.031	0.032	0.011	-0.09	-0.127	-0.126	-0.152
	(0.033)	(0.033)	(0.033)	(0.032)	(0.095)	(0.095)	(0.095)	(0.094)
Observations	12,844	12,844	12,844	12,844	6,113	6,113	6,113	6,113

Notes: Data from the 1987-2006 panel of CWHS tax returns. Permanent Income imputed using regression results from Table A1. Entries in Columns (1)-(4) represent the average marginal effect of each variable. Variables named "X * Quintile N" represent X interacted with a dummy for X falling in the N^{th} quintile of that variable. All specifications include region indicator variables and a constant. Standard errors are in parentheses.

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

Table 4. Percent Receiving a Benefit by Current and Permanent Income Quintiles, 2002-2006 Returns

A. Total Benefits

Quintile of	Quintile of Permanent Income					
Current Income	1	2	3	4	5	Total
1	0.043	0.095	0.107	0.081	0.077	0.056
2	0.159	0.255	0.291	0.266	0.176	0.243
3	0.246	0.335	0.444	0.455	0.332	0.417
4	0.409	0.401	0.545	0.623	0.615	0.601
5	0.286	0.333	0.545	0.685	0.794	0.773
Total	0.073	0.243	0.422	0.589	0.759	0.431

B. Saver's Credit

Quintile of	Quintile of Permanent Income					
Current Income	1	2	3	4	5	Total
1	0.019	0.040	0.027	0.020	0.026	0.024
2	0.083	0.118	0.112	0.146	0.027	0.111
3	0.063	0.075	0.113	0.188	0.139	0.118
4	0.023	0.011	0.023	0.017	0.013	0.017
5	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.033	0.091	0.091	0.047	0.004	0.052

C. EITC Rule Change

Quintile of	Quintile of Permanent Income					
Current Income	1	2	3	4	5	Total
1	0.023	0.049	0.044	0.027	0.051	0.029
2	0.075	0.100	0.087	0.058	0.068	0.091
3	0.019	0.021	0.014	0.008	0.000	0.014
4	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.033	0.072	0.026	0.003	0.000	0.026

D. Tax Benefits of Deferral or Exclusion

Quintile of	Quintile of Permanent Income					
Current Income	1	2	3	4	5	Total
1	0.024	0.058	0.064	0.054	0.051	0.033
2	0.130	0.222	0.258	0.231	0.095	0.210
3	0.240	0.329	0.436	0.446	0.318	0.410
4	0.386	0.401	0.545	0.623	0.615	0.601
5	0.286	0.333	0.545	0.685	0.794	0.773
Total	0.052	0.216	0.409	0.586	0.758	0.419

Notes: Data from the 1987-2006 panel of CWHS tax returns. Permanent income imputed using regression results from Table A1.

Table 5. Percent Receiving a Tax Benefit of Deferral or Exclusion for Each Type of Tax-Preferred Account by Current Income and Permanent Income, 2002-2006 Returns

A. Employer-Based Plan

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.020	0.040	0.043	0.020	0.051	0.025
2	0.113	0.196	0.213	0.173	0.068	0.181
3	0.192	0.292	0.390	0.386	0.220	0.362
4	0.273	0.294	0.489	0.578	0.549	0.549
5	0.000	0.255	0.430	0.620	0.729	0.706
Total	0.044	0.187	0.361	0.535	0.693	0.377

B. Self-Employed Plan

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.000	0.001	0.002	0.000	0.000	0.001
2	0.000	0.002	0.002	0.005	0.000	0.002
3	0.000	0.004	0.002	0.003	0.018	0.003
4	0.000	0.014	0.004	0.005	0.016	0.007
5	0.143	0.000	0.024	0.016	0.051	0.046
Total	0.000	0.002	0.003	0.007	0.046	0.013

C. Traditional IRA

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.002	0.008	0.014	0.007	0.026	0.004
2	0.013	0.019	0.029	0.048	0.014	0.020
3	0.047	0.035	0.033	0.046	0.067	0.037
4	0.114	0.078	0.040	0.041	0.047	0.043
5	0.000	0.020	0.080	0.046	0.040	0.041
Total	0.005	0.021	0.034	0.043	0.041	0.029

D. Roth IRA

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.003	0.013	0.016	0.027	0.000	0.006
2	0.009	0.016	0.033	0.038	0.014	0.018
3	0.019	0.023	0.050	0.050	0.049	0.044
4	0.045	0.042	0.066	0.067	0.090	0.070
5	0.143	0.118	0.073	0.094	0.098	0.097
Total	0.005	0.018	0.049	0.067	0.095	0.049

Notes: Data from the 1987-2006 panel of CWHS tax returns. Permanent income imputed using regression results from Table A1.

Table 6. Share of Benefits Received by Current Income and Permanent Income Quintiles, 2002-2006 Returns

A. Total Benefits

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.002	0.002	0.000	0.000	0.000	0.005
2	0.004	0.021	0.009	0.002	0.000	0.037
3	0.001	0.011	0.048	0.017	0.001	0.079
4	0.000	0.004	0.026	0.104	0.030	0.165
5	0.000	0.000	0.007	0.056	0.650	0.714
Total	0.008	0.039	0.091	0.179	0.682	1.000

B. Saver's Credit

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.048	0.031	0.007	0.001	0.000	0.087
2	0.062	0.262	0.105	0.031	0.001	0.460
3	0.004	0.049	0.197	0.117	0.008	0.375
4	0.000	0.002	0.016	0.049	0.011	0.078
5	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.114	0.344	0.325	0.198	0.020	1.000

C. EITC Rule Change

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.035	0.045	-0.005	0.000	0.004	0.078
2	0.102	0.465	0.153	0.020	0.007	0.748
3	0.008	0.052	0.103	0.011	0.000	0.174
4	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.145	0.562	0.251	0.031	0.011	1.000

D. Tax Benefits of Deferral or Exclusion

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.001	0.001	0.000	0.000	0.000	0.002
2	0.002	0.011	0.006	0.001	0.000	0.020
3	0.001	0.010	0.044	0.015	0.001	0.071
4	0.000	0.004	0.027	0.106	0.031	0.168
5	0.000	0.000	0.007	0.057	0.672	0.737
Total	0.005	0.026	0.084	0.180	0.704	1.000

Notes: Data from the 1987-2006 panel of CWHS tax returns. Permanent income imputed using regression results from Table A1.

Table 7. Share of Benefits of Deferral or Exclusion Received for Each Type of Tax-Preferred Account by Current Income and Permanent Income, 2002-2006 Returns

A. Employer-Based Plan

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.001	0.001	0.000	0.000	0.000	0.001
2	0.002	0.011	0.005	0.001	0.000	0.018
3	0.001	0.009	0.043	0.014	0.001	0.069
4	0.000	0.003	0.028	0.113	0.030	0.175
5	0.000	0.000	0.006	0.059	0.671	0.739
Total	0.003	0.024	0.082	0.187	0.703	1.000

B. Self-Employed Plan

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.000	0.000	0.000	0.000	0.000	0.001
2	0.000	0.002	0.001	0.000	0.000	0.003
3	0.000	0.002	0.002	0.001	0.001	0.007
4	0.000	0.002	0.002	0.012	0.013	0.029
5	0.002	0.000	0.011	0.024	0.922	0.960
Total	0.003	0.007	0.017	0.038	0.936	1.000

C. Traditional IRA

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.003	0.004	0.003	0.001	0.000	0.011
2	0.012	0.042	0.021	0.006	0.000	0.082
3	0.007	0.038	0.094	0.040	0.007	0.186
4	0.002	0.017	0.046	0.129	0.047	0.242
5	0.000	0.000	0.016	0.069	0.393	0.479
Total	0.025	0.102	0.180	0.245	0.448	1.000

D. Roth IRA

Quintile of Current Income	Quintile of Permanent Income					
	1	2	3	4	5	Total
1	0.004	0.004	0.001	0.001	0.000	0.010
2	0.005	0.016	0.014	0.003	0.000	0.038
3	0.002	0.013	0.073	0.028	0.003	0.118
4	0.001	0.005	0.038	0.125	0.052	0.221
5	0.001	0.002	0.011	0.071	0.529	0.613
Total	0.011	0.040	0.138	0.227	0.584	1.000

Notes: Data from the 1987-2006 panel of CWHS tax returns. Permanent income imputed using regression results from Table A1.

Table 8. Saver's Credit Rate Eligibility by Current Income and Permanent Income, 2002-2006 Returns

A. Saver's Credit Rate

Rate Based on	Rate Based On Permanent Income				
Current Income	0	0.1	0.2	0.5	Total
0	0.644	0.053	0.003	0.007	0.707
0.1	0.039	0.090	0.011	0.030	0.170
0.2	0.002	0.008	0.003	0.011	0.024
0.5	0.006	0.018	0.007	0.068	0.099
Total	0.691	0.169	0.024	0.116	1.000

B. Share of Benefits from Saver's Credit

Rate Based on	Rate Based On Permanent Income				
Current Income	0	0.1	0.2	0.5	Total
0	0.000	0.000	0.000	0.000	0.000
0.1	0.172	0.280	0.022	0.057	0.531
0.2	0.015	0.035	0.013	0.029	0.092
0.5	0.035	0.074	0.044	0.224	0.377
Total	0.223	0.388	0.079	0.310	1.000

Notes: Data from the 1987-2006 panel of CWHS tax returns. Permanent income imputed using regression results from Table A1.

Table 9. Estimation of Effect of Saver's Credit and EITC Policy Change on Participation and Amount of Contribution in Tax-Preferred Retirement Savings Accounts

	Probit of Contributing			Tobit of Amount Contributed		
	(1)	(2)	(3)	(4)	(5)	(6)
(A) Separate Saver's Credit and EITC Rule Change Treatments						
Eligible for Saver's Credit	0.028*			316.785**		
	(0.015)			(148.223)		
Benefit from EITC Rule Change	0.022			297.202		
	(0.022)			(228.158)		
Eligible for Saver's Credit and	0.024			229.906		
Benefit from EITC Rule Change	(0.016)			(161.183)		
(B) Different Saver's Credit Treatment for Each Rate						
Eligible for 10% Saver's Credit		0.031*			315.066**	
		(0.016)			(151.598)	
Eligible for 20% Saver's Credit		-0.013			75.776	
		(0.027)			(311.467)	
Eligible for 50% Saver's Credit		0.022			320.627	
		(0.021)			(218.005)	
Benefit from EITC Rule Change		0.021			293.286	
		(0.022)			(227.627)	
Eligible for Saver's Credit and		0.023			221.718	
Benefit from EITC Rule Change		(0.016)			(160.772)	
(C) Interacting Treatment with Whether Permanent Income is Above Income Threshold for Saver's Credit						
Eligible for Saver's Credit*						
Perm. Inc. < Income Threshold			0.030*			313.653*
			(0.017)			(161.328)
Perm. Inc. > Income Threshold			0.053**			492.269**
			(0.022)			(192.282)
Benefit from EITC Rule Change*						
Perm. Inc. < Income Threshold			0.020			277.036
			(0.024)			(237.955)
Perm. Inc. > Income Threshold			0.231*			1513.699
			(0.139)			(961.200)
Eligible for Saver's Credit and						
Benefit from EITC Rule Change*						
Perm. Inc. < Income Threshold			0.032*			264.072
			(0.018)			(169.824)
Perm. Inc. > Income Threshold			0.061			624.054
			(0.055)			(478.254)
Observations	22,666	22,666	22,666	22,666	22,666	22,666

Note: Data from the 1987-2006 panel of CWHS tax returns. Permanent Income imputed using regression results from Table A1. Each entry represents the average marginal effect (in the probit columns) or the coefficient (in the Tobit columns) on the interaction between an indicator for the variable on the left and the post (2005-2006) period. All specifications include indicator variables for the variables on the left alone, for the post period alone, year dummies, age, age squared, the sex of the primary filer, number of children at home and away from home, region indicator variables, and a constant. Standard errors are in parentheses.

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

Appendix Table A1: Permanent Income Regression Results

Marital Status-Presence of Children-Age Indicator Variables	Single Without Children	Single With Children	Married Without Children	Married With Children
Age 25			0.197***	
			(0.038)	
Age 26	0.077***	0.087***	0.223***	0.056**
	(0.011)	(0.019)	(0.035)	(0.026)
Age 27	0.145***	0.107***	0.251***	0.063**
	(0.013)	(0.021)	(0.034)	(0.026)
Age 28	0.201***	0.109***	0.312***	0.097***
	(0.016)	(0.023)	(0.035)	(0.027)
Age 29	0.250***	0.133***	0.322***	0.128***
	(0.020)	(0.025)	(0.037)	(0.029)
Age 30	0.289***	0.171***	0.352***	0.139***
	(0.024)	(0.029)	(0.039)	(0.032)
Age 31	0.307***	0.188***	0.347***	0.154***
	(0.029)	(0.032)	(0.042)	(0.035)
Age 32	0.323***	0.208***	0.375***	0.169***
	(0.033)	(0.036)	(0.045)	(0.039)
Age 33	0.328***	0.227***	0.374***	0.180***
	(0.037)	(0.040)	(0.048)	(0.042)
Age 34	0.329***	0.239***	0.382***	0.204***
	(0.041)	(0.044)	(0.052)	(0.046)
Age 35	0.345***	0.242***	0.414***	0.210***
	(0.046)	(0.048)	(0.055)	(0.050)
Age 36	0.346***	0.252***	0.412***	0.225***
	(0.050)	(0.052)	(0.059)	(0.054)
Age 37	0.349***	0.278***	0.422***	0.226***
	(0.054)	(0.056)	(0.063)	(0.058)
Age 38	0.360***	0.269***	0.439***	0.246***
	(0.059)	(0.060)	(0.067)	(0.062)
Age 39	0.333***	0.271***	0.446***	0.251***
	(0.063)	(0.065)	(0.071)	(0.066)
Age 40	0.346***	0.269***	0.430***	0.253***
	(0.067)	(0.069)	(0.074)	(0.070)
Age 41	0.336***	0.264***	0.434***	0.263***
	(0.072)	(0.073)	(0.078)	(0.075)
Age 42	0.332***	0.276***	0.440***	0.265***
	(0.076)	(0.078)	(0.082)	(0.079)
Age 43	0.314***	0.282***	0.454***	0.261***
	(0.081)	(0.082)	(0.086)	(0.083)
Age 44	0.319***	0.279***	0.420***	0.270***
	(0.085)	(0.086)	(0.090)	(0.087)
Age 45	0.327***	0.281***	0.415***	0.274***
	(0.089)	(0.091)	(0.094)	(0.092)
Age 46	0.312***	0.283***	0.392***	0.268***
	(0.094)	(0.095)	(0.098)	(0.096)
Age 47	0.312***	0.252**	0.394***	0.265***
	(0.098)	(0.100)	(0.102)	(0.100)
Age 48	0.289***	0.237**	0.375***	0.259**
	(0.103)	(0.104)	(0.106)	(0.105)
Age 49	0.280***	0.223**	0.378***	0.258**
	(0.107)	(0.109)	(0.111)	(0.109)

Number of Children Indicator Variables	
1	0.141***
	(0.018)
2	0.165***
	(0.018)
3	0.191***
	(0.018)
4	0.218***
	(0.020)
5	0.224***
	(0.023)
Region Indicator Variables	
Mid-Atlantic	0.005
	(0.018)
East North Central	-0.072***
	(0.018)
West North Central	-0.075***
	(0.021)
South Atlantic	-0.076***
	(0.017)
East South Central	-0.094***
	(0.021)
West South Central	-0.041**
	(0.019)
Mountain	-0.055***
	(0.019)
Pacific	0.036**
	(0.018)
Year Indicator Variables	
1988	0.026***
	(0.007)
1989	0.036***
	(0.011)
1990	0.040***
	(0.014)
1991	0.026
	(0.019)
1992	0.039*
	(0.023)
1993	0.047*
	(0.027)
1994	0.069**
	(0.032)
1995	0.098***
	(0.036)
1996	0.130***
	(0.040)

Appendix Table A1 (Cont.): Permanent Income Regression Results

Marital Status-Presence of Children-Age Indicator Variables	Single Without Children	Single With Children	Married Without Children	Married With Children	Year Indicator Variables	
Age 50	0.257**	0.186*	0.348***	0.262**	1997	0.178***
	(0.111)	(0.113)	(0.115)	(0.113)		(0.045)
Age 51	0.242**	0.233**	0.322***	0.245**	1998	0.235***
	(0.116)	(0.117)	(0.119)	(0.118)		(0.049)
Age 52	0.233*	0.209*	0.307**	0.220*	1999	0.281***
	(0.120)	(0.122)	(0.123)	(0.122)		(0.053)
Age 53	0.230*	0.176	0.275**	0.223*	2000	0.322***
	(0.125)	(0.127)	(0.128)	(0.126)		(0.058)
Age 54	0.195	0.154	0.267**	0.212	2001	0.324***
	(0.129)	(0.131)	(0.132)	(0.131)		(0.062)
Age 55	0.175	0.145	0.241*	0.187	2002	0.335***
	(0.134)	(0.136)	(0.136)	(0.135)		(0.067)
Age 56	0.13	0.108	0.228	0.17	2003	0.329***
	(0.138)	(0.141)	(0.140)	(0.140)		(0.071)
Age 57	0.105	0.105	0.193	0.156	2004	0.361***
	(0.142)	(0.145)	(0.145)	(0.144)		(0.075)
Age 58	0.063	0.076	0.153	0.102	2005	0.392***
	(0.147)	(0.150)	(0.149)	(0.149)		(0.080)
Age 59	0.044	0.142	0.132	0.087	2006	0.428***
	(0.151)	(0.155)	(0.153)	(0.153)		(0.084)
Age 60	0.002	0.104	0.095	0.054		
	(0.156)	(0.160)	(0.158)	(0.158)	Constant	9.993***
						(0.035)
Observations	265,898					

Notes: Data from the 1987-2006 panel of CWHS tax returns. Standard errors in parentheses. Coefficients on three of the Age 25 interactions are dropped because of collinearities with the constant and number of children indicator variables. New England is the excluded region, and 1987 is the excluded year.
* significant at 10%; ** significant at 5%; *** significant at 1%