The Elasticity of Taxable Income: Evidence from a New Panel of Tax Returns

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Abstract. This paper estimates the elasticity of taxable income to the net-of-tax share using a new panel of tax returns. This panel consists of a stratified random sample of taxpayers in 1987 that were followed until 1996, spanning the OBRA90 and OBRA93 tax changes. In addition, unlike previous datasets used to estimate this elasticity, this panel contains a large number of high income taxpayers and doesn't suffer from differential sampling rates when the income of a respondent decreased. Results from the base specification suggest that the elasticity of taxable income to the current year's net-of-tax share lies between .4 and .5. However, these estimates depend crucially on if and how mean reversion is controlled for, with estimates ranging from -.36 to 1.23 resulting if alternative specifications are used. In addition, when tax rates in adjacent years are controlled for to account for income shifting, large and significant shifting elasticities are estimated, and none of the implied long-run elasticities are positive. These results suggest that taxpayers responded to the tax changes in the 1990's by shifting significant amounts of income, deductions, and/or exclusions across years, but that the long-run effect of these changes was quite small.

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1 Introduction

Estimating the elasticity of taxable income to the net-of-tax share has produced a voluminous literature, largely because of the importance of obtaining an accurate measure of this parameter. As has been noted by Feldstein (1995) and others, this parameter captures the full response of taxpayers' incomes along numerous margins to a change in marginal tax rates.[1] This is because it includes not only the response of labor supply to changes in tax rates, but also changes in deductions, exclusions, and the form of compensation. Thus, if one is interested in the revenue effects of a change in the tax law, a first order question is to what extent taxable income will respond, and a rough answer can be given by the taxable income elasticity.

As a result, a number of studies have attempted to estimate the elasticity of taxable income, using a wide range of data and estimation methodologies. Given the voluminous nature of this literature, this paper does not provide an extensive survey.[2] Examining several studies that have used various datasets of tax returns, however, illustrates the range of elasticities that have been estimated.

Looking at the Economic Recovery Tax Act of 1981 (ERTA81), Lindsey (1987) found estimates of the taxable income elasticity ranging from 1.6 to 1.8. Examining the Tax Reform Act of 1986 (TRA86), Feldstein (1995) examined changes in tax rates from 1985 to 1988 and estimated elasticities ranging from 1.04 to 3.05, depending on the

[1] Note, however, that tax changes often don't take this form, and so even this parameter doesn't fully capture the effects of many tax law changes.
[2] For a nice survey of the elasticity of taxable income literature, see Giertz (2004).

specification and the definition of taxable income. Auten and Carroll (1999) also examine TRA86 using changes in tax rates from 1985 to 1989 and find smaller elasticities ranging from .54 to .67. Gruber and Saez (2000) examine both ERTA and TRA86 using data from the Continuous Work History Sample (CWHS) compiled by the Statistics of Income (SOI) division of the IRS. Looking at differences in tax rates over three year intervals, they find elasticities around .40 for taxable income, and .12 for a broader measure of income, and find that these elasticities differ across income levels.

Examining the Omnibus Budget Reconciliation Acts of 1990 and 1993 (OBRA90 and OBRA93), Carroll (1998) looks at tax changes over 1 year intervals from 1989 to 1995 and estimates an elasticity of .38, which drops to .32 when examining a broader measure of income. Sammartino and Weiner (1997) find a substantial decrease in reported incomes for high income taxpayers following the 1993 tax increase. However, they conclude that this may have been due to income shifting across years, and not a permanent response to the tax increase. Finally, Goolsbee (2000) examined OBRA90 and OBRA93 using data on executive compensation, and finds elasticities in excess of one. When he controls for shifting of income, however, the long-run elasticity of taxable income drops to below .4.[3]

All of these studies, though, used data sets that were less than ideal along some dimension to estimate the taxable income elasticity. Lindsey (1987) used repeated cross section data, requiring the undesirable assumption that individuals did not change their rank in the income distribution pre- and post-tax change in order to estimate the elasticity. Feldstein (1995) and Gruber and Saez (2002) used public-release panels of tax returns, but their panels contained a relatively small number of high income observations,

[3] Other studies in this literature include Slemrod (1996), Saez (1999, 2004), and Kopczuk (2005).

where the recent literature has suggested much of the responsiveness occurs. Auten and Carroll (1999) and Carroll (1998) on the other hand, utilize cross sections of taxpayers from the SOI's Individual Tax Files, matching individuals that are in the sample in years before and after the tax change in the Auten and Carroll study or in adjacent years in the Carroll study. However, due to the sampling structure of the Individual Tax Files, an individual whose income decreased is less likely to be sampled in consecutive periods than one whose income increased, requiring the use of weights to correct for this selection bias. Finally, Goolsbee's (2000) dataset only included information on corporate executives, and so the comparability of this group to taxpayers as a whole is unclear.

Overall, the ideal dataset for an elasticity of taxable income estimation study would consist of a true panel of taxpayers that contains a large number of high income individuals who are followed over numerous tax changes. In this way, one can capture the responsiveness of high and ultra-high income individuals, among whom it is typically thought that the responsiveness to tax rates is concentrated. In addition, if taxpayers are followed regardless of what happens to their stream of income, there is no need to use a weighting strategy to correct for the data set's sampling scheme. It is such a panel that is used in this study.

Using the Treasury Department's internal 1987-96 Family Panel of tax returns, the elasticity of taxable income is estimated using data that span two major tax changes, OBRA90 and OBRA93. Numerous specifications are used to examine how the estimated elasticities depend on the sample, specification, and lag structure used. In general, the base specification yields results that are consistent with the rest of the literature, namely that the elasticity of taxable income with respect to the contemporaneous net-of-tax share

is between .4 and .5, which is near the middle of previous estimates of the elasticity. However, these estimates depend crucially on how one controls for mean reversion. Without any control for mean reversion, the estimates increase to over one; when one controls for the log of base year income to account for mean reversion, the estimates are significantly negative.

If individuals are able to shift income across adjacent years by changing the timing of transactions in response to differences in tax rates, then none of the above estimates are clean estimates of the long-run effect of tax rates on taxable income. Rather, they suffer from two biases. First, the estimates are biased upward due to the estimated elasticity capturing both the shifting effect and the real effect of tax rates. Second, the estimates are likely biased downward due to omitted variables bias. When tax rates from adjacent years are included in the specification, the results change markedly. Similar to Goolsbee (1997), the coefficients on adjacent years are significant and large, and this finding is robust to numerous specification changes. The implied long-run effect in these specifications is often negative, sometimes significantly so, which suggests that the estimates of the long-run effects should be viewed cautiously. Nevertheless, the large and significant coefficients on adjacent years' tax rates suggest that most, if not all, of the response to tax changes takes the form of shifting income and deductions across adjacent years.

The paper proceeds as follow. Section 2 outlines the theoretical model underlying estimates of the elasticity of taxable income and the underlying assumptions needed to estimate the elasticity of taxable income using a conventional specification. Section 3 describes the dataset used. Section 4 summarizes the estimation strategy, and section 5

presents the base results. Section 6 presents the results from some robustness checks. Finally, Section 7 examines to what extent the responsiveness of taxable income to tax rate changes consists of the shifting of income and deductions across years. Section 8 concludes.

2 Theoretical Model

Estimates of the elasticity of taxable income typically start with an estimation equation that is of the form

$$\ln Y_{it} = \beta \ln(1-\tau_{it}) + \gamma Z_{it} + \eta_i + \varepsilon_{it} \qquad (1)$$

where Y_{it} denotes some measure of income, $1-\tau_{it}$ denotes the net-of-tax rate, Z_{it} denotes other factors that might affect a taxpaying unit's income (including demographic characteristics, geographic characteristics, and overall income trends) and η_i is a taxpaying unit fixed effect.

Differencing between years *t* and *t'* to eliminate the household specific term yields

$$\Delta \ln Y_{it} = \beta \Delta \ln(1-\tau_{it}) + \gamma Z_{it} + \varepsilon_{it} \qquad (2)$$

which is the predominant estimating equation used in this literature.

Implicit in this estimation equation, however, is a theoretical model of consumer choice over consumption and leisure bundles. In this section, this model is presented to illustrate the assumptions implicit when estimating taxable income elasticities using this

estimation specification.[4]

First, some notation. Let C_j denote ordinary (non-deductible and non-excludable) consumption of type *j*, D_k denote deductible outlays of type *k* (for example, charitable contributions or deductible work expenses), E_l denote excludable consumption of type *l* (for example, health insurance benefits), and I_m denote income of type *m* (for example, labor or interest income), where some (or some set) of I_m includes the value of excludable consumption received at work. Finally, let M denote the exemption to which the taxpayer is entitled.

Suppose that an individual is maximizing utility over these three types of consumption, subject to the constraint that the total spent on consumption is equal to after tax income. Similar to Gruber and Saez (2002), for simplicity assume that income generating activities exhibit disutilites because they require effort, so that in the reduced form utility is a function of income earned. Initially assuming a one-period static choice model, letting *t* denote the individual's marginal tax rate, and ignoring progressive taxation and the choice of itemization status, the consumer's problem is

$$\begin{aligned} &\max U\left(\{C_j\}_{j=1}^{J}, \{D_k\}_{k=1}^{K}, \{E_l\}_{l=1}^{L}, \{I_m\}_{m=1}^{M}, Z\right) \\ &s.t. \sum_{j=1}^{J} p_j C_j + \sum_{k=1}^{K} p_k D_k + \sum_{l=1}^{L} p_l E_l = (1-\tau)\left\{\sum_{m=1}^{M} I_m - M\right\} \end{aligned} \quad (3)$$

where the p_j's, p_k's, and p_l's denote the net-of-tax prices of regular, deductible, and excludable consumption, respectively. Solving for the first order conditions yields the system of demand and supply equations

[4] Slemrod (2001) discusses a more general model that incorporates avoidance behavior that is costly.

$$\begin{aligned}
&\left\{C_j = C_j\left(\left\{p_j\right\}_{j=1}^{J}, \left\{p_k\right\}_{k=1}^{K}, \left\{p_l\right\}_{l=1}^{L}, (1-\tau), Z\right)\right\}_{j=1}^{J} \\
&\left\{D_k = D_k\left(\left\{p_j\right\}_{j=1}^{J}, \left\{p_k\right\}_{k=1}^{K}, \left\{p_l\right\}_{l=1}^{L}, (1-\tau), Z\right)\right\}_{k=1}^{K} \\
&\left\{E_l = E_l\left(\left\{p_j\right\}_{j=1}^{J}, \left\{p_k\right\}_{k=1}^{K}, \left\{p_l\right\}_{l=1}^{L}, (1-\tau), Z\right)\right\}_{l=1}^{L} \\
&\left\{I_m = I_m\left(\left\{p_j\right\}_{j=1}^{J}, \left\{p_k\right\}_{k=1}^{K}, \left\{p_l\right\}_{l=1}^{L}, (1-\tau), Z\right)\right\}_{m=1}^{M}
\end{aligned} \quad (4)$$

If one normalizes the tax exclusive price of all consumption goods to 1, then the price of all deductible and excludable consumption goods becomes the net-of-tax rate, $(1-\tau)$. Taking this into account yields the simplified system of demand and supply equations

$$\begin{aligned}
&\left\{C_j = C_j\left((1-\tau), Z\right)\right\}_{j=1}^{J} \\
&\left\{D_k = D_k\left((1-\tau), Z\right)\right\}_{k=1}^{K} \\
&\left\{E_l = E_l\left((1-\tau), Z\right)\right\}_{l=1}^{L} \\
&\left\{I_m = I_m\left((1-\tau), Z\right)\right\}_{m=1}^{M}
\end{aligned} \quad (5)$$

Note that, theoretically, the partial derivatives of the C_j's with respect to the net-of-tax rate are unambiguously negative, but the partial derivatives of the deductible and excludable types of consumption and income are all theoretically ambiguous, and depend on the relative sizes of income and substitution effects.

Taxable income is the sum of income less deductions, exclusions, and the exemption, so

$$TI = \sum_{m=1}^{M} I_m\left((1-\tau), Z\right) - \sum_{k=1}^{K} D_k\left((1-\tau), Z\right) - \sum_{l=1}^{L} E_l\left((1-\tau), Z\right) - M \quad (6)$$

Consider a tax rate change from *t* to *t'* in which there is no change in the tax base. Since the prices of all of the components of taxable income change identically, as Feldstein (1996) noted, one can treat taxable income as a composite good. Thus, taxable income can be modeled as being only a function of the net-of-tax price, and the

expression for taxable income simplifies to

$$TI = TI\big((1-\tau), Z\big) \quad (7)$$

This result suggests that estimating the elasticity of taxable income to the net-of-tax rate captures the entire range of behavioral impacts to a tax change in one compact parameter.

However, in practice, tax changes often involve a change in the definition of what is taxable. For example, under TRA86, the deduction for personal interest was phased out. Consider, then, a tax rate change from t to t', but where deductible good *k* becomes non-deductible. In this case, one can no longer treat taxable income as a composite good, and the responsiveness of taxable income cannot be summarized by a single parameter. Rather, in this case, one must know the cross price elasticities with respect to the newly nondeductible item of income and the other goods that remain deductible and excludable in order to calculate the change in taxable income. Of course, one could assume that these elasticities are zero, but this assumption will be more or less good depending on the substitutability or complementarity of the newly nondeductible good with the other items that remain part of taxable income. Similar reasoning holds for any change in the definition of what comprises taxable income.

To deal with this, most papers have resorted to estimating a constant law elasticity of taxable income, by backing out (or adding back) items whose status as a component of taxable income changes in the time period under analysis. However, as noted above, doing this requires the assumption that the cross price elasticities of these goods and the goods that are always in taxable income are zero for the resulting estimate to not be biased.

In addition, it is clear from the foregoing discussion that, unless the elasticity of all

components of taxable income with respect to the net-of-tax rate are the same, the elasticity of taxable income will depend on what goods are and are not deductible, what goods are and are not excludable, and what types of income are taxable. For example, suppose that, under a certain definition of taxable income, all deductible and excludable goods and income have elasticities with respect to the net-of-tax rate of .4, and that all cross price elasticities are zero. Now suppose that another good is made deductible, but its own price elasticity is one, and for the moment, suppose that all cross price elasticities are zero. In this case, the elasticity of taxable income with respect to the net-of-tax rate will be higher with the good being deductible than without. Further, suppose that the cross price elasticity of one of the goods is high, since there is another good that is readily substitutable for it. In this case, the elasticity will be larger still. As noted by Slemrod (1998) and Kopczuk (2003), this implies that the taxable income elasticity is a function of the technology of avoidance or evasion that is available.

Finally, suppose that instead of a static model, an individual is making a choice of consumption bundles in each of T periods. For ease of exposition, assume that the choice is made under perfect certainty, that the individual can lend or borrow at an interest rate of zero, and the individual's discount factor is zero. This consumer's problem is

$$\max\left\{U_t\left(\left\{C_j\right\}_{j=1}^{J},\left\{D_k\right\}_{k=1}^{K},\left\{E_l\right\}_{l=1}^{L},\left\{I_m\right\}_{m=1}^{M},Z\right)\right\}_{t=1}^{T}$$
$$s.t.\sum_{t=1}^{T}\left(\sum_{j=1}^{J}p_jC_j+\sum_{k=1}^{K}p_kD_k+\sum_{l=1}^{L}p_lE_l\right)=\sum_{t=1}^{T}(1-\tau_t)\left\{\sum_{m=1}^{M}I_m-M\right\} \quad (8)$$

Again normalizing the tax exclusive prices of all consumption goods to 1, the demand system becomes

$$\begin{aligned}\left\{C_j=C_j\left(\left\{(1-\tau_t)\right\}_{t=1}^{T},Z\right)\right\}_{j=1}^{J}\\ \left\{D_k=D_k\left(\left\{(1-\tau_t)\right\}_{t=1}^{T},Z\right)\right\}_{k=1}^{K}\\ \left\{E_l=E_l\left(\left\{(1-\tau_t)\right\}_{t=1}^{T},Z\right)\right\}_{l=1}^{L}\\ \left\{I_m=I_m\left(\left\{(1-\tau_t)\right\}_{t=1}^{T},Z\right)\right\}_{m=1}^{M}\end{aligned} \quad (9)$$

If all cross-time price elasticities are zero, then the above argument holds, and one can treat taxable income as a composite commodity that is solely a function of the contemporaneous net-of-tax rate. However, several types of consumption and income will be readily substitutable across periods. For example, individuals are often able to change the timing of their realization of some components of income without a large change to their overall financial well-being. In addition, taxpayers can often choose whether to make a charitable donation this year or next with little change in the utility they receive from the donation. In this case, taxable income will be a function of the net-of-tax rate in the current period, as well as adjacent periods. As shown below, failure to control for these tax rates in the estimation equation results in a coefficient that can be badly biased.

Nevertheless, the specification in which the current year taxable income depends only on the current year tax rate tends to be the dominant one in the literature, and as such, it is this specification with which this paper begins. However, it is important to note that the elasticities estimated in this fashion are elasticities of taxable income with

respect to the net-of-tax share, given the definition of taxable income as it existed in 1990, and given the assumptions that the cross price elasticities for items that entered or exited the definition of taxable income are zero, and that shifting across years is not possible.

3 The Family Panel, 1987-96

The data used in this study come from an internal ten-year panel of tax returns held by the U.S. Department of the Treasury, known as the "Family Panel."[5] This panel consists of two segments – a "cohort" segment and a "refreshment segment."

The cohort segment started with a cross section of tax returns for 1987 that were filed with the IRS in 1988 and sampled by the IRS's Statistics of Income Division in that year. This sample consisted of approximately 85,000 tax returns. All taxpayers represented on the return of a member of this cross section, including secondary taxpayers on joint returns and dependents, were pulled into the sample. Then, over the following nine years, through returns filed in 1997 for tax year 1996, the SOI division included in the panel any return filed that reported any panel member as a primary or secondary taxpayer, including tax returns filed by panel members who were dependents of another taxpayer. Because of this sampling methodology, using this dataset it is possible to form "tax families," consisting of a primary and possibly secondary filer, and all dependents.

[5] For more information on Treasury's Family Panel, see Cilke et al. (1999, 2000). This section borrows heavily from those papers' description of the data.

Because some members of the cohort panel dropped out of the tax-filing U.S. population due to death, emigration, or falling below the tax filing thresholds, while others entered because of immigration or becoming filers, over time this cohort panel represents a declining portion of the population. To keep the panel representative required an additional "refreshment" segment that represented individuals who became non-dependent tax return filers after 1987, and their dependents. This segment was created from the returns in the SOI cross section samples for 1988 through 1996 filed by CWHS primary filers who were not filers in 1987. The dataset also includes a number of imputed tax returns that represent permanent non-filers and non-filers who filed in at least one year between 1987 and 1996, and a few returns of panel member filers that were not included in the SOI sample. These imputed returns are not used in the analysis in this paper, however.

Overall, the Family Panel consists of 1.4 million actual or imputed tax returns, spanning two major tax changes, OBRA90 and OBRA93. Numerous sample cuts were made, however, before the estimation was performed. Most of these cuts follow what has been done previously in the literature.

All observations for which data has been imputed are eliminated from the sample. The sample is then cut to include only those observations in which the primary filer was not a dependent at any point during the panel. In addition, observations in which there is a change in filing status at some point in the panel are dropped. These cuts are done to eliminate changes in taxable income that are due to changes in filing status. Also cut were all returns in which the primary filer is under the age of 25, to eliminate changes in income due to the completion of schooling.

For the dependent variable, four definitions of income are used. The first, which will be referred to a total income, follows Carroll (1998) and includes all income reported on line 23 of IRS form 1040 for tax years 1988-95 (or analogous lines on 1040A or 1040EZ), and on line 22 for tax years 1987 and 1996.[6] The second, gross income, follows Gruber and Saez (2002), and is total income less social security benefits and capital gains. The third, total taxable income, comes from line 37 of IRS form 1040[7] (or analogous lines on 1040A or 1040EZ) and includes adjusted gross income less exemptions and deductions. To keep the definition of this variable consistent across years in the panel, several adjustments are made to this variable which are outlined in the appendix. Finally, gross taxable income follows Gruber and Saez (2002), and includes total taxable income less social security benefits and capital gains.

To control for demographic characteristics of the filers in the panel, information is used on the primary filer's age, gender, marital status, itemizer status, number of children, whether one or more children lived outside of the filer's house, and region of the country. In addition, following Carroll (1998), filers are identified as entrepreneurs if they reported any amount of partnership, subchapter S corporation, or sole proprietorship income.

Marginal tax rates in this study include federal income tax, FICA, and state income tax rates. Federal income and FICA taxes are calculated using a version of the Treasury Department's internal tax calculator that was modified for use with the Family Panel, by incrementing wage and salary income by $100 and calculating the marginal increase in taxes owed. State income tax rates are calculated using a simplified state tax calculator,

[6] An adjustment is made to this variable in tax years 1988 and earlier, when reimbursed employee expenses were included in this line. These expenses are backed out of total income for these years.
[7] In 1987, this comes from form 1040 line 36.

derived from tables in Commerce Clearing House's State Tax Handbook.[8]

As noted below, in most specifications, only observations in which income in the base year is at least $50,000 are included in the regressions. After this cut, 334,173 observations remained for possible use in one of the estimation specifications. Sample statistics for the relevant variables in the resulting sample are presented in Table 1.

4 Estimation Method

The estimation method used in this paper for the most part follows that used in previous papers. To estimate the effect of a change in the net-of-tax rate on a taxpayer's income, regressions of the form

$$\ln\left(\frac{Y_{it'}}{Y_{it}}\right) = \alpha + \beta \ln\left(\frac{1-\tau_{it'}}{1-\tau_{it}}\right) + \delta f\left(\overline{Y}_{it}, Y_{it}\right) + \gamma Z_{it} + \varepsilon_{it} \qquad (10)$$

were run, where *t* denotes the base year, and *t'* denotes a year subsequent to the base year, Y_{it} denotes one of the four measures of income in year *t*, $\overline{Y_{it}}$ denotes an average of that measure of income over all years the taxpayer is observed (used as a proxy for permanent income), $1-\tau_{it}$ denotes the net-of-tax rate, and Z_{it} denotes other factors that might affect a taxpaying unit's income.

As noted in Goolsbee (2000), in estimating taxable income elasticities, it is

[8] For the state tax calculations, all taxpayers are assumed to take the standard deduction and available exclusions given their marital status and number of children. Although this ignores much of the complexity in state income tax laws and introduces some error into the marginal tax rate variable, given that the sample is cut to all households with base income above $50,000, it is predominantly each state's top rate that applies to observations used in the estimation. In addition, results were generally robust to the exclusion of state tax rates in the analysis.

preferable to use data that span a number of tax changes, and to control for income trends by income class. Thus, some specifications include a function of average income across the years observed in the panel as an independent variable. Average income is used as a proxy for the permanent income of the taxpayer, and as a result, the inclusion of these variables attempt to control for secular changes in the income distribution that differ depending on an individuals permanent income and that are due to factors other than changes in taxes. Two specifications are used - the log of average income (similar to Carroll (1998)), and a ten piece spline in the log of average income (similar to Gruber and Saez (2002)).[9]

Several studies (including Moffit and Wilhelm (1997), Gruber and Saez (2002), and Giertz (2004, 2006)) have also noted the importance of controlling for mean reversion when estimating taxable income elasticities. Similar to previous studies, to eliminate bias in the estimated coefficients resulting from mean reversion at the bottom of the income distribution, individuals are included in the regressions only if they had total income in excess of $50,000 in the base year if using total or total taxable income as the dependent variable, and gross income in excess of $50,000 in the base year if using gross or gross taxable income as the dependent variable.[10] This is a higher threshold than was used in

[9] Note, however, that Gruber and Saez (2002) use the log of base year income, whereas this study uses the log of average income. In their specification, the log of base year income is intended to control for both secular changes in the income distribution and mean reversion, whereas this study includes separate controls for mean reversion. As a robustness check, specifications were run including the log of base year income, but the resulting coefficients on the net-of-tax rate were sizably *negative* and highly significant, which is counter to results found in the rest of the literature.

[10] The specifications in this paper were also run using a threshold of $10,000. However, when decomposing elasticities by income deciles, large significant negative elasticities were found for individuals with low income, for whom tax rates had changed little over this time period, suggesting that either mean reversion or spurious correlation was driving these results. However, the overall elasticities are relatively robust to the inclusion or exclusion of these individuals, because the estimations weight by income.

Gruber and Saez (2002), but the same as that used in Carroll (1998).[11]

To eliminate bias due to mean reversion at the high end of the income distribution, I include three dummy variables: a dummy for base year income being between one and two times average income, a dummy for base year income being between two and three times average income, and a dummy for base year income being above three times average income.

To account for the endogeneity of the change in net-of-tax rates to the change in income between *t* and *t'*, I instrument for the actual change in tax rates. Following Gruber and Saez (2002), the instrument that I use is $\ln\left(\frac{1-\tau_{t'}^{t}}{1-\tau_{t}}\right)$, where $\tau_{t'}^{t}$ denotes the marginal tax rate observation *i* would have faced in year *t'* if all of the components of income had been the amounts in year *t* inflated by increases in the CPI. As such, the instrument reflects a difference in tax rates that is due solely to changes in tax law, and not due to taxpayer behavior.[12]

To examine whether the result differ depending on the set of years used, specifications with a both a one and three year difference between *t* and *t'* are estimated. In the literature, several differences have been used. Using a shorter lag has the advantage that underlying changes in the income distribution are likely to be less pronounced, making it more likely that the estimated coefficient is the tax effect. However, the estimated taxable income elasticities are more likely to be driven by shifting across two close years, and so it is unlikely that the estimates capture a real

[11] Carroll (1998), however, only included individuals for whom income was above the threshold in each and every year under analysis.

[12] Note that this instrument will also capture tax changes that result from individuals crossing unindexed thresholds, even if the tax law hasn't changed.

response of taxpayers to changes in tax rates.

On the other hand, if one uses a longer lag that includes years that are well before and after any tax change, then one is more likely to estimate the real effect of taxes. However, one must control for more pronounced exogenous trends in income to properly identify the tax effect, which is harder to accomplish. In addition, in the time period under analysis, very little time passed between each tax change.[13] Finally, numerous states changed tax rates over this period. Thus, a set of years before and after a tax change in which tax law stayed constant in the timeframe under analysis simply does not exist.

For the most part, estimates presented in this paper following the weighting scheme of Giertz (2006), in which observations are weighted according to their sampling importance and income levels, so that elasticities reflect the change that would occur to the overall amount of reported income. Following Gruber and Saez (2002), to prevent any ultra-high income individual observation from having undue influence on the resulting estimates, the income weights are truncated at $1 million. However, the results are robust to relaxing this truncation.

In Table 2, similar to Gruber and Saez (2002), the means and standard deviations in the change in net-of-tax share instrument by income group and year are presented. Table 2a presents these statistics for one year differences, while Table 2b presents these statistics for three year differences.

[13] For example, in 1988, the TRA tax rate changes had been fully phased in, but the phaseout of the deductibility of personal interest and other changes were still occurring during the 1989 tax year. Then in 1990, OBRA passed, which changed rates starting with the 1991 tax year. These rates only stayed constant until 1993, for which OBRA93 increased tax rates on higher incomes. In addition, the calculation of payroll taxes changed in 1988 and1990 with increases in the OASDI rate, in 1991-93 with increases in the earnings limit up to which the HI tax applied, and in 1994 with the removal of the HI earnings limit.

Looking at the one year differences, the increase in the net-of-tax share that resulted from TRA86 for the 1987-88 year pair is apparent, as are the decreases in the net-of-tax share that resulted from OBRA90 and OBRA93 in the 1990-91 and 1992-93 pairs, respectively. As expected, the change in the net-of-tax share is generally larger for higher income groups than for lower income groups. However, even among the group of taxpayers with $50,000 to $100,000 in income, the standard deviation in the net-of-tax share instrument tends to be equal to or greater than that for higher income groups. This suggests that individuals with all levels of income will contribute somewhat to the identification of the overall elasticity, and provides some hope that it will be possible to estimate income specific elasticities even for the low-income group.

Turning to the three year differences, the impacts of the tax law changes aren't as concentrated as in the previous table, since now a number of year pairs span each particular tax change. In addition, variation in the instrument is much more consistent across the year pairs. This suggests that the resulting estimate will be driven less by a particular set of year pairs when using three year differences than when using one year differences. Once again, variation in the instrument is nontrivial among the lowest income group.

5 Results

Table 3 presents results from a specification where the dependent variable is the one year difference in log income. The results are grouped by the type of income used as the dependent variable (gross income, total income, gross taxable income, and total taxable income.) Within each group are three specifications. The first specification contains no controls for secular changes in the income distribution or mean reversion. The second specification uses the log of average income to control for secular changes in the income distribution. In addition, three dummy variables are included to control for mean reversion: a dummy for base year income being above average income but below twice average income, a dummy for base year income being above twice average income but below three times average income, and a dummy for base year income being above three times average income. The third specification includes a ten piece spline in average income and the mean reversion dummy variables.

Looking at the specification without income controls, the estimated elasticities of taxable income are .626 for gross income and .551 for total income. As expected, the estimated elasticities increase (though only slightly) if the dependent variable is taxable income, with estimated elasticites of .628 for gross taxable income and .661 for total taxable income. All of these estimates are highly significant. When the log of average income and the mean reversion dummy variables are added, the estimates drop somewhat, ranging from .435 to .548, again with taxable income elasticities tending to be higher than their counterparts. When, a spline in log average income is included, the elasticities decrease further, and range from .411 to .493. Again, all of these estimates are highly significant.

These estimated elasticities are consistent with, but slightly higher than the

estimates of .26 to .38 found in Carroll (1998), who also examined a one year difference. This may be due to the fact that the Carroll study only includes those observations for which income is above $50,000 in every year observed. If more taxpayers' incomes fell below the $50,000 threshhold around the time of the tax increases of the 1990's than rose above it, eliminating all observations whose incomes crossed the threshold would differentially drop taxpayers with declining incomes, driving down the estimated elasticity.

Table 4 presents results using the same ten piece spline specification as in the previous table, but the net-of-tax share is interacted with dummy variables that indicate being in the sixth through tenth deciles and the bottom half of the income distribution, in order to estimate separate elasticities by income group. Similar to previous studies, a significant response to the net-of-tax share among the highest income group is found. Interestingly, these results contain (at least marginally) significant coefficients for the bottom half of the income distribution. Most of the coefficients for the sixth through ninth deciles, however, are insignificant, and are typically smaller than those at the top and the bottom.

Table 5 presents results from specifications similar to those in Table 3, but now three year differences are used for the income and tax variables. Comparing these results to Table 3, the estimated elasticities tend to be higher than, but quite close to, those found when a one year difference was used. When average income and mean reversion are not controlled for, the estimated elasticities now center around .7. However, controlling for the log of average income and mean reversion decreases the estimated elasticities to between .552 and .573, and the estimated elasticities decrease to between .437 and .485

when a spline in log average income is included. Again, all of these estimates are highly significant, but contrary to what would be expected, the coefficients are smaller for the taxable income dependent variables. This difference, however, is not significant.

Comparing these results to the larger literature, these results are well within the range of previously estimated elasticities, falling well below some results found in Lindsey (1987), Feldstein (1995), Auten and Carroll (1999) and Goolsbee (2000) (before shifting of income is netted out). However, the estimated elasticities are slightly larger than those found in Gruber and Saez (2002), who also look at a three year difference and find an elasticity of .12 for gross income and .4 for taxable income, and are consistent with those found in Auten and Carroll (1999), who look at a six year difference and find an elasticity of .57 when weighted two stage least squares is used and nontax factors and occupation are included as controls.

Table 6 presents estimates of these elasticities by income group. For gross and total income, all elasticities are significantly positive except for the eighth decile, and the highest elasticities are found for the seventh decile. Thus, the elasticities do not appear to increase monotonically with income, at least for these measures of income. However, when the dependent variables are gross taxable and total taxable income, estimated elasticities are positive and strongly significant only for the highest income decile. Several coefficients below the top decile are sizable and positive, but because of large standard errors, these coefficients are insignificant.

Taken together, the results so far suggest elasticities of taxable income that are similar to elasticities of gross or total income, and that fall between .4 and .5, but that the responsiveness is not concentrated at the top of the income distribution.

6 Robustness Checks

To check the robustness of the above results to some of the key specification choices that were made, several robustness checks are performed to the specifications presented in Table 5.

To examine the effect of using the Family Panel, which contains many more high income taxpayers than the public use SOI samples that have often been used, the sample was cut to include only those who were members of the CWHS, the type of sample used in Gruber and Saez (2002).[14] As noted above, the sample used in this paper contains a much larger group of high income individuals, providing many more observations from which to identify the elasticity of those with high incomes. For example, Gruber and Saez's sample contains an average of 341 observations each year that report gross income of $100,000 and above, while the Family Panel contains an average of over 8,000 observations each year whose total income exceeds *$1 million*. However, the CWHS is a true random sample, so the results do not have to be weighted by sampling probability, whereas the Family Panel is a stratified random sample for which weights are necessary.[15]

As can be seen from Panel A of Table 7, cutting the sample to include only the CWHS observations yields estimated elasticities that are smaller than those found in the

[14] Note, however, that their study examined the 1980 tax decreases, and not the 1990 tax increases.
[15] Note, however, that unlike the samples used in Carroll (1998) and Auten and Carroll (1999), the probability of staying in the sample does not depend on changes in income.

full Family Panel when income trends and mean reversion are controlled for. In addition, standard errors predictably increase given the smaller sample size, driving most of the resulting estimates to insignificance. When the spline in average income is included, the estimated elasticity of gross income of .243 is above, though not significantly different from, Gruber and Saez (2002) estimate of .12, while the elasticity of gross taxable income of .013 is below, but not significantly different from their estimate of .4. Thus, it appears that including only CWHS respondents in estimating taxable income elasticities yields smaller and less precise estimates than those found when many more high income taxpayers are available to identify the response.

Second, to examine how the estimate changes when using a different income cutoff for inclusion in the sample, the specification in Table 5 was reestimated while changing the cutoff to $10,000 in base year income. The results from this specification are presented in Panel B of Table 7. As would be expected given prior results in the literature, including individuals with base year income between $10,000 and $50,000 tends to significantly decrease the estimated elasticities. When the spline in average income is included, these elasticities range from .277 to .393, depending on the dependent variable used, with gross taxable and total taxable income elasticities greater than those for gross and total income.

Finally, it was noted above that controls for mean reversion and exogenous trends in the income distribution are important when estimating taxable income elasticities. To examine the effect that this choice has on the estimated elasticities, two robustness checks were run.

First, the mean reversion dummies from the specification in Table 5 were removed.

In this way, the estimation specification still controls for exogenous trends in the income distribution which would tend to bias the elasticities downward, but not for mean reversion at the high end of the income distribution which, since marginal tax rates were generally increasing during this period, would tend to bias estimated elasticities upward. Looking at Panel C of Table 7, it appears that this is indeed the case, with estimated elasticities more than doubling, ranging from 1.147 to 1.229 when the ten piece spline is included.

Second, the log average income variables and mean reversion dummy variables were replaced with the log of base year income. This specification is similar to that used in Gruber and Saez (2002), and is based on a strategy for controlling for mean reversion suggested in Moffitt and Wilhelm (1997). When this is done, the estimated elasticities are now significantly negative, with magnitudes ranging from -.222 to -.362 when a ten piece spline in log base year income is included. It is hard to say definitively why the estimates are negative in this specification, but there are at least two possible explanations. The first is that the true elasticity is negative, due to a large income effect. However, one would not expect this to be the case a priori. Second, since the change in tax rates over the period under analysis was larger for higher income observations, it may be that controlling for base period income leaves only spurious negative correlation between the instrument and the dependent variable, driving the coefficient negative. Regardless of the reason, the unexpected significantly negative coefficients suggest that these estimates should be viewed cautiously.

However, these final two specification checks also suggest that estimated elasticities can change dramatically in response to small changes in the specification

used. Although the specification choices made when estimating the regressions in Table 5 above seem to be sensible, results from other plausible specifications can differ greatly. These findings then, tend to reinforce a point made in Giertz (2006), that it may be more fruitful to examine how components of taxable income respond to changes in tax rates, since these components are likely to be less driven by exogenous trends and mean reversion than income per se.

7 Is Shifting Across Years Driving the Results?

In Section 5, taxable income elasticities were estimated that are roughly in the center of the range of results estimated previously. However, as noted above, these estimates come from a restrictive specification in which taxable income is assumed to be a function of only the net-of-tax share in the current period. This specification becomes less plausible when one considers the tax laws in place during the sample period, in which several of the year pairs contain years in which TRA86 was phasing in, or in which a tax change (OBRA90 or OBRA93) went into effect, both of which may have led taxpayers to shift income away from or deductions to years in which the marginal tax rate was higher.

A common method to attempt to abstract away from this type of shifting is to cut the sample to include only years many years before and many years after a tax change, so that any change in income is likely to not be the result of shifting. Unfortunately, the 1987-96 period does not contain large sequences of years in which tax rates are stable

between tax changes. The most that can be done in the time period under analysis is to cut the sample to include three year differences that span the 1990's tax law changes, even though rates change in years close to the years included. Thus, three years were included: 1989, during which the rate changes in TRA86 were fully phased in, 1992, which is after the implementation of the OBRA90 rates but before the implementation of the OBRA93 rates, and 1995. Since shifting of income would be expected to bias elasticities upward, one would expect that cutting the sample in this way would yield elasticities that are lower than those found in the previous tables.

The results from this specification are presented in Table 8. Comparing this table to Table 5, it is apparent that cutting the sample in this way actually increases the estimated elasticities. There are at least two possible reasons for this result. First, if it takes a number of years for taxpayers to react to a change in tax rates, including years in which rates change would have biased downward the estimated elasticity, since it would have been a combination of the larger long-run and smaller short-run effects. Second, although these years straddle tax changes, they are by no means distant from years in which rates changed, and so these estimates could be just as biased from shifting behavior as those in previous tables, or even more so if shifting was particularly large in these years.

To probe further whether shifting is driving the results requires augmenting the estimation specification in (10). Assume now that because individuals are able to shift components of taxable income across adjacent years, taxable income in a particular year is a function both of the contemporaneous net-of-tax share, and the difference between the contemporaneous and adjacent net-of-tax shares. Formally, omitting other variables

that affect income,

$$\ln(Y_{it}) = \beta \ln(1-\tau_{it}) + \beta^f [\ln(1-\tau_{it+1}) - \ln(1-\tau_{it})] + \beta^b [\ln(1-\tau_{it}) - \ln(1-\tau_{it-1})] + \varepsilon_{it} \quad (11)$$

where β captures the long-run (or "real") effect of the tax rate on taxable income, β^f captures the change in taxable income that results from income being shifted into (out of) the current year because the net-of-tax share is lower (higher) one year forward, and β^b captures the change in taxable income that results from income having been shifted into (out of) the current year because the net-of-tax share was lower (higher) one year back. The expected signs of the additional coefficients are $\beta^f < 0$ and $\beta^b > 0$. Taking the difference across a three year interval and combining terms yields

$$\begin{aligned} \ln(Y_{it+3}) - \ln(Y_{it}) = (\beta - \beta^f + \beta^b)[\ln(1-\tau_{it+3}) - \ln(1-\tau_{it})] \\ + \beta^f [\ln(1-\tau_{it+4}) - \ln(1-\tau_{it+1})] - \beta^b [\ln(1-\tau_{it+2}) - \ln(1-\tau_{it-1})] + \varepsilon_{it} \end{aligned} \quad (12)$$

Denote the coefficient on the net-of-tax share estimated from specifications above (that don't include adjacent tax rates) as $\hat{\beta}$. Examining (12), it is clear that if taxpayers are able to shift components of taxable income across adjacent years, then $\hat{\beta}$ will be a biased estimate of β for two reasons. First, $\hat{\beta}$ will be biased upward from β because it comprises the sum of the long-run and two shifting coefficients. Second, the estimation will also suffer from omitted variables bias, but assuming that $Cov([\ln(1-\tau_{it+3}) - \ln(1-\tau_{it})], [\ln(1-\tau_{it+4}) - \ln(1-\tau_{it+1})]) > 0$ and $Cov([\ln(1-\tau_{it+3}) - \ln(1-\tau_{it})], [\ln(1-\tau_{it+2}) - \ln(1-\tau_{it-1})]) > 0$, this will tend to bias $\hat{\beta}$ downward toward β.

Note, however, that this equation also suggests a straightforward way of testing for the presence of shifting. If the one-period forward and backward differences in net-of-tax

rates are included in the estimation specification, the coefficients on these will be unbiased estimates of β^f and $-\beta^b$, respectively.[16] If these estimated coefficients are significant, it suggests the presence of shifting. In addition, the estimated coefficient on the contemporaneous tax rates will be purged of omitted variables bias, resulting in an unbiased estimate of $\left(\beta - \beta^f + \beta^b\right)$. Summing this coefficient with the other two estimated coefficients thus yields an unbiased estimate of β.

The results from such an exercise are presented in Table 9. Within each group, the first column presents the estimated elasticities from the specifications that included a ten piece spline in Table 5. In the second column within each group, following Goolsbee (2000), the difference in net-of-tax rates one year ahead is included. This specification is theoretically undesirable, even if it is only possible to shift components of income forward to the next year. This is because if shifting income forward is possible, then the current year's income would include items shifted from the previous year because of the difference between the current and previous years' rates, and so the previous year's rate should be controlled for as well. Nevertheless, this specification is included so that results are comparable to those in the Goolsbee study. In the third column of each group, the differences in net-of-tax rates both one year forward and backward are included in the specification.

Looking at the first column, when shifting was not accounted for, the taxable income elasticity for all dependent variables ranged from .437 to .485. In column 2, when the one year forward difference in net-of-tax rates is included, the results change

[16] Note that, unlike the contemporaneous change in tax rates, it is not necessary to instrument for these differences in net-of-tax rates, since they are not functions of the contemporaneous income levels, and so are not endogenous.

dramatically. As expected, adding the adjacent net-of-tax share variable dampens the omitted variables bias, resulting in a higher coefficient on the contemporaneous net-of-tax share difference variable. However, this increase is small compared to the magnitude of the shifting elasticities that are estimated. For example, for gross income, the shifting forward elasticity is -.624, but the coefficient on the contemporaneous net-of-tax shares increases only to .569, yielding an insignificant implied long-run elasticity of -.054. For total income, the shifting forward elasticity is -.676, with the implied long-run elasticity an insignificant -.080. For the two taxable incomes, the shifting forward elasticities are again significant, and are larger than those for gross and total income, with magnitudes of -.814 and -.862. This suggests that individuals may be more able to shift deductions and exclusions across years than they are for income per se. However, because of these larger shifting coefficients, the implied long-run elasticities are now negative and significant, with magnitudes of -.216 and -.271.

When the one year backward difference in net-of-tax rates is also included, across the types of dependent variable, the shifting coefficients increase in magnitude and are still highly significant, ranging from -.822 to -1.241. Similar to when only forward shifting was controlled for, both the forward and backward shifting coefficients are larger for the taxable income variables, with magnitudes always exceeding one. However, across all specifications of the dependent variable, the long-run elasticity is estimated to be significantly negative.

The significance of the implied long-run elasticities suggests that these estimates should be taken with a grain of salt. Although negative elasticities are theoretically possible because income effects are not separated out in these specifications, they would

not be expected a priori. Nevertheless, the large and highly significant shifting coefficients suggest that previous papers that did not account for shifting likely estimated taxable income elasticities that were biased substantially upwards. Even if one does not believe that long-run elasticities are negative, these results suggest that whatever the long-run elasticities are, they are very unlikely to be large.

Comparing these results to Goolsbee (2000), that paper found coefficients on contemporaneous tax rates ranging from 1.113 to 1.427, and on one period forward rates ranging from -.763 to -1.356, yielding long-run effects of less than .4. Although this paper found long-run elasticities that are in all cases negative that were in some cases significant, the range of shifting elasticities found here is roughly consistent with those in that paper.

In Table 10, the robustness of these shifting coefficients to the same sample and specification changes as those in Table 7 is examined. Across these specifications, several patterns emerge. The estimated shifting elasticities are always significantly negative, and are of similar magnitude to that found in the base specification. The sole exception to this is the specification in which mean reversion is not controlled for, in which the estimated shifting elasticities are considerably larger than those found in the base specification. Nevertheless, all of these specifications suggest a large amount of shifting (with elasticities greater in magnitude than -.6) in response to tax differences between adjacent years.

This is especially striking in light of the fact that the implied long-run elasticities vary tremendously across specifications. When mean reversion is not controlled for, the largest positive estimates of long-run elasticities are obtained. Even here, however, when

both forward and backward tax rates are controlled for, the implied long-run elasticity is always lower than .35, is insignificant for three of the dependent variables, and only marginally significant for the other. Other specifications tend to find negative implied long-run elasticities. These estimates should probably be viewed cautiously, though, particularly the large negative long-run elasticities estimated which include the log of base year income.

Taken together, however, these results suggest that although there is a large, statistically significant amount of shifting of income components across years in response to differences in net-of-tax shares, the implied long-run effects are probably quite small. Even when mean reversion was not accounted for, the largest estimated long-run elasticity was .331, which is toward the middle to low end of the range of previous estimates. Thus, these results provide little support for the contention that, at least during the period under analysis, the rate increases led to large long-run decreases in incomes. They do, however, suggest that taxpayers responded significantly to the tax changes by shifting sizable amounts of income, deductions, and/or exclusions across years to minimize their tax bill.

To probe whether the degree of shifting differs across the income distribution, in Table 11, the shifting specifications in Table 9 are re-estimated, but all tax rate variables are interacted with income quantiles. These results suggest that, regardless of how the shifting equation is specified, and across dependent variables, throughout the income distribution there is a large and statistically significant amount of income shifting, with shifting coefficients again larger for taxable incomes. For all quantiles of income, the coefficients on adjacent tax rates are large and statistically significant, and interestingly,

the coefficients do not increase monotonically with the income quantile.

Looking at the implied long-run elasticities, for no income decile is the implied long-run elasticity significantly positive. However, the significance and magnitude of several of the negative implied long-run elasticities suggest that these results again should be viewed with caution. Nevertheless, these results again provide no evidence that there was a substantial long-run decrease in taxable income in response to the rate increases in the 1990's.

8 Conclusion

This paper used data from the Treasury Department's internal 1987-96 Family Panel of tax returns to estimate taxable income elasticities. In the base specification, results emerged that were consistent with the rest of the literature, that the elasticity of taxable income with respect to the contemporaneous net-of-tax share is between .4 and .5, which is near the middle of previous estimates of the elasticity. However, these estimates depended crucially on whether and how mean reversion was controlled for. Without any control for mean reversion, the estimates increase to over one; when one controls for mean reversion using the log of base year income, the estimates are significantly negative. Since this range, which resulted from small changes in the specification, includes most a priori educated guesses as to what the taxable income elasticity would be, this suggests that it may never be possible to pin down the taxable income elasticity with any reasonable degree of accuracy.

Further, it is shown that if individuals are able to shift income across adjacent years by changing the timing of transactions in response to differences in tax rates, then none of the above estimates are clean estimates of the long-run effect of tax rates on taxable income. Rather, they suffer from two biases. First, the estimates are biased upward due to the estimated elasticity capturing both the shifting effect and the real effect of tax rates. Second, the estimates are likely biased downward due to omitted variables bias. When tax rates from adjacent years are included in the specification, the results change markedly. Similar to Goolsbee (1997), the coefficients on adjacent years are significant and large, and this pattern is much more robust to the specification used. Although the implied negative long-run effects should probably be viewed cautiously, the large and significant coefficients on adjacent years' tax rates suggest that most, if not all, of the response to the tax changes under analysis took the form of shifting income components across adjacent years.

These results, however, should not be misconstrued to mean that there is never a real, long-run effect of changes in tax rates. One has to keep in mind that these elasticities were estimated using data that spanned OBRA90 and OBRA93, and so are estimates of the shifting and longer run effects of those laws in particular. It is plausible that these estimates might apply to other tax changes that include small changes in tax rates, but they are less likely to apply to substantially larger tax rate changes.

To put these tax changes into historical perspective, although between 1990 and 1992 statutory marginal tax rates for those in the highest bracket increased by roughly 10%, from 28% to 31%, this translates into a decrease in the net-of-tax share of only 4.2%. The increase in the top rate from 31% to 39.6% in OBRA93 had a somewhat

larger effect on the net-of-tax share, decreasing it by 12.5%. However, compared to the tax rate changes in ERTA81, where net-of-tax share for those in the highest bracket increased by two thirds, or TRA86, where the net-of-tax share increased by 44% for those in the highest bracket between 1986 and 1988,[17] these changes were small. These results suggest that a tax change on the order of magnitude of those passed in the 1990's is sufficiently large to induce individuals to reorganize their finances to take advantage of the tax wedge between adjacent years, but not large enough to affect real, long-run behavior. However, it could be that when the net-of-tax share changes by larger amounts, the change is sufficiently large to induce people to change their real behavior as well.

Overall, the results in this paper suggest that, whatever the true long-run effects of tax changes are, an estimate of this elasticity is notoriously difficult to pin down, even with a dataset that is close to ideal for estimating it. As a result, the magnitude of the elasticity of taxable income is likely to be a parameter over which economists argue for some time to come.

[17] For those who fell into the 28% bracket in 1988. For those who fell into the 33% "bubble" the increase was a still substantial 34%.

Data Appendix

To create a 1990 constant law definition of gross and total taxable income, several items needed to be added or removed from taxable income in other years. These changes to reported taxable income are as follows:

1987-90 – Personal interest was added back to taxable income, so that personal interest is treated as nondeductible across all years.

1990-97 – Deductible self employment taxes are added back, so that they are treated as non-deductible in all years.

1991-97 – To ensure that the "Pease" limitation on deductions does not affect taxable income in any year, the amount of deductions limited by "Pease" was subtracted from taxable income.

1994-97 – Above the line moving expenses for non-itemizers are added back for non-itemizers, so that moving expenses are treated as an itemized deduction in all years.

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Table 1: Unweighted Sample Statistics

Variable	Mean	Std. Dev.
Income Variables		
Total Income	$1,054,592	$4,082,686
Gross Income	$1,051,722	$4,082,456
Total Taxable Income	$864,251	$3,616,143
Gross Taxable Income	$861,381	$3,615,970
Permanent Gross Income	$981,057	$2,934,763
Permanent Total Income	$984,245	$2,935,165
Avg. Inc. <= Income <= 2*Avg Inc.	0.418	0.493
2*Avg Inc. <= Income <= 3*Avg. Inc.	0.036	0.186
3*Avg. Inc. <= Income	0.029	0.168
One Year Difference in Logs of:		
Total Income	-0.095	0.665
Gross Income	-0.098	0.674
Total Taxable Income	-0.115	0.988
Gross Taxable Income	-0.110	0.966
Three Year Difference in Logs of:		
Total Income	-0.226	0.855
Gross Income	-0.236	0.870
Total Taxable Income	-0.262	1.214
Gross Taxable Income	-0.254	1.185
Demographic Variables		
Age	53.733	12.860
Age Squared	3052.641	1464.792
Married	0.901	0.299
Number of Children	0.979	1.223
Child Away from Home	0.009	0.093
Entrepreneur	0.697	0.460
Itemizer	0.923	0.267
Sex of Primary Filer (1=Female)	0.171	0.377
Sex of Secondary Filer (1=Female)	0.855	0.352
Census Division		
New England	0.069	0.253
Mid-Atlantic	0.197	0.398
East North Central	0.144	0.351
West North Central	0.052	0.222
South Atlantic	0.171	0.377
East South Central	0.039	0.193
West South Central	0.100	0.300
Mountain	0.045	0.207
Pacific	0.178	0.383
Member of CWHS	0.082	0.275
Total Number of Observations	334,173	

Table 2a: Sample Statistics for Change in Net of Tax Share Instrument

Year	$50K and above	$50K to $100K	$100K to $500K	$500K to $1M	$1M and above
1987-88	0.096	0.034	0.088	0.151	0.142
	(0.089)	(0.062)	(0.080)	(0.075)	(0.083)
	39,596	11,604	11,087	5,795	11,110
1988-89	-0.004	-0.007	-0.003	-0.002	-0.002
	(0.028)	(0.034)	(0.033)	(0.018)	(0.016)
	39,081	11,953	12,206	5,453	9,469
1989-90	-0.001	-0.002	0.000	0.000	0.000
	(0.031)	(0.036)	(0.037)	(0.014)	(0.016)
	38,881	12,172	12,856	5,353	8,500
1990-91	-0.030	-0.005	-0.026	-0.058	-0.060
	(0.046)	(0.032)	(0.055)	(0.032)	(0.028)
	38,034	12,112	12,944	5,148	7,830
1991-92	-0.001	0.000	-0.001	-0.002	-0.001
	(0.027)	(0.020)	(0.041)	(0.011)	(0.009)
	36,686	11,884	13,289	4,883	6,630
1992-93	-0.066	-0.002	-0.062	-0.135	-0.138
	(0.079)	(0.019)	(0.075)	(0.058)	(0.059)
	36,024	11,708	12,975	4,680	6,661
1993-94	-0.009	-0.005	-0.008	-0.010	-0.014
	(0.037)	(0.039)	(0.042)	(0.025)	(0.021)
	35,369	11,428	13,342	4,405	6,194
1994-95	0.002	0.002	0.002	0.002	0.001
	(0.030)	(0.026)	(0.040)	(0.012)	(0.009)
	35,102	11,569	13,479	4,280	5,774
1995-96	0.000	0.001	0.000	0.000	0.000
	(0.033)	(0.028)	(0.047)	(0.009)	(0.007)
	35,348	11,486	13,532	4,338	5,992

Note: Means, standard deviations, and number of observations reported. Income cuts are based on Total Income variable.

Table 2b: Sample Statistics for Change in Net of Tax Share Instrument

Year	$50K and above	$50K to $100K	$100K to $500K	$500K to $1M	$1M and above
1987-90	0.093	0.028	0.086	0.149	0.140
	(0.095)	(0.071)	(0.090)	(0.076)	(0.084)
	39,596	11,604	11,087	5,795	11,110
1988-91	-0.036	-0.012	-0.029	-0.061	-0.061
	(0.055)	(0.053)	(0.064)	(0.038)	(0.033)
	39,078	11,953	12,204	5,453	9,468
1989-92	-0.032	-0.005	-0.027	-0.060	-0.062
	(0.056)	(0.045)	(0.069)	(0.036)	(0.033)
	38,881	12,172	12,856	5,353	8,500
1990-93	-0.100	-0.006	-0.089	-0.196	-0.202
	(0.111)	(0.041)	(0.108)	(0.069)	(0.070)
	38,034	12,112	12,944	5,148	7,830
1991-94	-0.075	-0.005	-0.071	-0.145	-0.155
	(0.087)	(0.035)	(0.084)	(0.061)	(0.066)
	36,686	11,884	13,289	4,884	6,629
1992-95	-0.073	-0.005	-0.068	-0.143	-0.151
	(0.086)	(0.036)	(0.083)	(0.062)	(0.063)
	36,024	11,708	12,975	4,680	6,661
1993-96	-0.007	-0.004	-0.006	-0.009	-0.013
	(0.041)	(0.037)	(0.054)	(0.025)	(0.019)
	35,371	11,429	13,343	4,405	6,194

Note: Means, standard deviations, and number of observations reported. Income cuts are based on Total Income variable.

Table 3: One Year Difference, 1987-96

	Gross Income			Total Income			Gross Taxable Income			Total Taxable Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Δln(1-τ)	0.626***	0.475***	0.458***	0.551***	0.435***	0.411***	0.628***	0.490***	0.465***	0.661***	0.548***	0.493***
	(0.086)	(0.065)	(0.064)	(0.077)	(0.058)	(0.057)	(0.105)	(0.083)	(0.083)	(0.101)	(0.081)	(0.079)
Married	0.119***	0.016*	0.012	0.125***	0.018**	0.012	0.088***	-0.020*	-0.025**	0.096***	-0.027***	-0.040***
	(0.015)	(0.009)	(0.009)	(0.014)	(0.008)	(0.008)	(0.014)	(0.010)	(0.011)	(0.014)	(0.010)	(0.010)
Age/100	0.122	0.582***	0.598***	-0.049	0.443***	0.464***	0.306*	0.956***	0.973***	-0.099	0.577***	0.623***
	(0.135)	(0.096)	(0.096)	(0.122)	(0.090)	(0.090)	(0.157)	(0.114)	(0.114)	(0.152)	(0.111)	(0.109)
Age Squared/1000	-0.060***	-0.079***	-0.080***	-0.033***	-0.066***	-0.067***	-0.070***	-0.107***	-0.108***	-0.027*	-0.077***	-0.080***
	(0.014)	(0.009)	(0.009)	(0.012)	(0.009)	(0.009)	(0.015)	(0.011)	(0.011)	(0.014)	(0.010)	(0.010)
Sex of Primary Filer	-0.016**	-0.008	-0.008	-0.015**	-0.005	-0.005	-0.020***	-0.010*	-0.009	-0.022***	-0.009	-0.008
	(0.007)	(0.005)	(0.005)	(0.006)	(0.004)	(0.004)	(0.008)	(0.006)	(0.006)	(0.008)	(0.006)	(0.006)
Itemizer	0.106***	0.025***	0.020***	0.093***	0.020***	0.013**	0.113***	0.031***	0.021***	0.124***	0.035***	0.018**
	(0.010)	(0.006)	(0.006)	(0.008)	(0.005)	(0.005)	(0.010)	(0.007)	(0.007)	(0.010)	(0.007)	(0.007)
Number of Children	0.007***	0.003*	0.003*	0.006***	0.003*	0.003*	0.008***	0.003	0.003	0.009***	0.005**	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Child Away from Home	0.011	-0.028***	-0.029***	0.011	-0.025***	-0.026***	0.007	-0.038**	-0.039**	0.011	-0.033**	-0.035**
	(0.011)	(0.008)	(0.008)	(0.010)	(0.008)	(0.008)	(0.019)	(0.016)	(0.016)	(0.019)	(0.016)	(0.016)
Entrepreneur	-0.037***	-0.025***	-0.025***	-0.037***	-0.023***	-0.021***	-0.079***	-0.065***	-0.065***	-0.081***	-0.070***	-0.067***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
ln(Average Income)		0.028***			0.034***			0.039***			0.059***	
		(0.002)			(0.002)			(0.003)			(0.003)	
ln(Average Income)*First Decile			0.011**			0.017***			0.010**			0.019***
			(0.004)			(0.004)			(0.005)			(0.005)
ln(Average Income)*Second Decile			0.016***			0.024***			0.015***			0.033***
			(0.004)			(0.004)			(0.005)			(0.005)
ln(Average Income)*Third Decile			0.017***			0.025***			0.017***			0.034***
			(0.004)			(0.004)			(0.005)			(0.005)
ln(Average Income)*Fourth Decile			0.016***			0.024***			0.017***			0.035***
			(0.004)			(0.004)			(0.005)			(0.005)
ln(Average Income)*Fifth Decile			0.016***			0.024***			0.017***			0.034***
			(0.004)			(0.004)			(0.005)			(0.005)
ln(Average Income)*Sixth Decile			0.017***			0.025***			0.018***			0.036***
			(0.004)			(0.004)			(0.005)			(0.005)
ln(Average Income)*Seventh Decile			0.016***			0.024***			0.017***			0.035***
			(0.004)			(0.004)			(0.005)			(0.005)
ln(Average Income)*Eighth Decile			0.016***			0.025***			0.018***			0.036***
			(0.004)			(0.004)			(0.005)			(0.004)
ln(Average Income)*Ninth Decile			0.017***			0.025***			0.019***			0.036***
			(0.004)			(0.003)			(0.005)			(0.004)
ln(Average Income)*Tenth Decile			0.018***			0.025***			0.020***			0.036***
			(0.004)			(0.003)			(0.004)			(0.004)
Avg. Inc. <= Income < 2*Avg. Inc.		-0.210***	-0.207***		-0.212***	-0.207***		-0.275***	-0.269***		-0.276***	-0.264***
		(0.003)	(0.003)		(0.003)	(0.003)		(0.004)	(0.004)		(0.004)	(0.004)
2*Avg. Inc. <= Income < 3*Avg. Inc.		-0.843***	-0.830***		-0.910***	-0.892***		-1.062***	-1.046***		-1.175***	-1.140***
		(0.014)	(0.014)		(0.015)	(0.015)		(0.020)	(0.020)		(0.022)	(0.022)
3*Avg. Inc. <= Income		-1.779***	-1.765***		-1.804***	-1.783***		-2.110***	-2.095***		-2.298***	-2.262***
		(0.041)	(0.041)		(0.039)	(0.039)		(0.058)	(0.059)		(0.064)	(0.064)
Constant	-0.268***	-0.417***	-0.280***	-0.235***	-0.447***	-0.336***	-0.359***	-0.625***	-0.372***	-0.277***	-0.745***	-0.463***
	(0.071)	(0.071)	(0.079)	(0.068)	(0.068)	(0.075)	(0.089)	(0.091)	(0.101)	(0.088)	(0.091)	(0.099)
Observations	319,715	316,917	316,917	325,852	323,044	323,044	313,510	310,980	310,980	320,232	317,681	317,681

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base year (inflated by the CPI for the tax calculation in the later year). All specifications include region and year dummies.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: One Year Difference, 1987-96: By Income Decile

	Gross Income	Total Income	Gross Taxable Income	Total Taxable Income
	(1)	(2)	(3)	(4)
Δln(1-τ)*Tenth Decile	0.496***	0.534***	0.572***	0.617***
	(0.072)	(0.071)	(0.089)	(0.090)
Δln(1-τ)*Ninth Decile	0.02	0.13	-0.049	0.01
	(0.126)	(0.136)	(0.175)	(0.194)
Δln(1-τ)*Eighth Decile	0.055	0.098	-0.131	0.08
	(0.161)	(0.119)	(0.188)	(0.194)
Δln(1-τ)*Seventh Decile	0.203	0.233*	0.066	0.225
	(0.144)	(0.128)	(0.208)	(0.197)
Δln(1-τ)*Sixth Decile	0.001	0.165	-0.014	0.233
	(0.259)	(0.236)	(0.290)	(0.283)
Δln(1-τ)*Bottom Half	0.797***	0.249*	0.613**	0.456*
	(0.235)	(0.148)	(0.311)	(0.247)
Married	0.011	0.013*	-0.025**	-0.039***
	(0.009)	(0.007)	(0.010)	(0.010)
Age	0.597***	0.446***	0.967***	0.614***
	(0.096)	(0.087)	(0.112)	(0.107)
Age Squared	-0.079***	-0.065***	-0.107***	-0.079***
	(0.009)	(0.008)	(0.011)	(0.010)
Sex of Primary Filer	-0.008	-0.005	-0.009	-0.008
	(0.005)	(0.004)	(0.005)	(0.006)
Itemizer	0.021***	0.011**	0.021***	0.017**
	(0.006)	(0.005)	(0.008)	(0.007)
Number of Children	0.003**	0.003*	0.003	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)
Child Away from Home	-0.029***	-0.025***	-0.038**	-0.035**
	(0.008)	(0.008)	(0.016)	(0.015)
Entrepreneur	-0.025***	-0.020***	-0.065***	-0.066***
	(0.003)	(0.003)	(0.004)	(0.004)
ln(Average Income)*First Decile	0.010**	0.017***	0.010*	0.019***
	(0.004)	(0.004)	(0.005)	(0.005)
ln(Average Income)*Second Decile	0.016***	0.025***	0.015***	0.034***
	(0.004)	(0.004)	(0.005)	(0.005)
ln(Average Income)*Third Decile	0.018***	0.025***	0.017***	0.034***
	(0.004)	(0.004)	(0.005)	(0.005)
ln(Average Income)*Fourth Decile	0.017***	0.024***	0.018***	0.035***
	(0.004)	(0.004)	(0.005)	(0.005)
ln(Average Income)*Fifth Decile	0.017***	0.024***	0.017***	0.035***
	(0.004)	(0.004)	(0.005)	(0.005)
ln(Average Income)*Sixth Decile	0.019***	0.025***	0.019***	0.036***
	(0.004)	(0.004)	(0.005)	(0.005)
ln(Average Income)*Seventh Decile	0.018***	0.024***	0.018***	0.036***
	(0.004)	(0.004)	(0.005)	(0.005)
ln(Average Income)*Eighth Decile	0.018***	0.025***	0.019***	0.037***
	(0.004)	(0.004)	(0.005)	(0.005)
ln(Average Income)*Ninth Decile	0.019***	0.025***	0.020***	0.037***
	(0.004)	(0.003)	(0.005)	(0.004)
ln(Average Income)*Tenth Decile	0.019***	0.025***	0.021***	0.037***
	(0.004)	(0.003)	(0.004)	(0.004)
Avg. Inc. <= Income < 2*Avg. Inc.	-0.205***	-0.204***	-0.266***	-0.261***
	(0.003)	(0.003)	(0.004)	(0.004)
2*Avg. Inc. <= Income < 3*Avg. Inc.	-0.831***	-0.881***	-1.041***	-1.132***
	(0.016)	(0.015)	(0.021)	(0.023)
3*Avg. Inc. <= Income	-1.777***	-1.768***	-2.094***	-2.255***
	(0.045)	(0.041)	(0.062)	(0.067)
Constant	-0.294***	-0.331***	-0.379***	-0.465***
	(0.080)	(0.075)	(0.102)	(0.100)
Observations	316,917	323,044	310,980	317,681

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base year (inflated by the CPI for the tax calculation in the later year). All specifications include region and year dummies.

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

Table 5: Three Year Difference, 1987-96

	Gross Income			Total Income			Gross Taxable Income			Total Taxable Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Δln(1-τ)	0.693***	0.552***	0.475***	0.715***	0.560***	0.485***	0.755***	0.573***	0.466***	0.710***	0.572***	0.437***
	(0.087)	(0.060)	(0.060)	(0.083)	(0.057)	(0.057)	(0.103)	(0.078)	(0.077)	(0.103)	(0.079)	(0.077)
Married	0.194***	0.052***	0.037*	0.218***	0.070***	0.052***	0.125***	-0.007	-0.028**	0.134***	-0.011	-0.039***
	(0.033)	(0.020)	(0.020)	(0.031)	(0.018)	(0.019)	(0.022)	(0.013)	(0.013)	(0.023)	(0.014)	(0.013)
Age/100	-0.829***	0.134	0.219	-0.754***	0.231	0.298*	-0.357	0.855***	0.959***	-0.939***	0.493***	0.624***
	(0.218)	(0.141)	(0.138)	(0.226)	(0.161)	(0.158)	(0.243)	(0.162)	(0.159)	(0.241)	(0.162)	(0.157)
Age Squared/1000	-0.012	-0.061***	-0.066***	-0.001	-0.065***	-0.069***	-0.050**	-0.124***	-0.131***	0.015	-0.090***	-0.100***
	(0.021)	(0.013)	(0.013)	(0.022)	(0.016)	(0.015)	(0.024)	(0.016)	(0.015)	(0.023)	(0.016)	(0.015)
Sex of Primary Filer	-0.014	-0.001	0	-0.019	-0.003	-0.002	-0.040***	-0.017**	-0.015*	-0.037**	-0.011	-0.008
	(0.013)	(0.008)	(0.008)	(0.013)	(0.008)	(0.008)	(0.015)	(0.008)	(0.008)	(0.015)	(0.008)	(0.008)
Itemizer	0.133***	0.007	-0.018**	0.113***	-0.002	-0.027***	0.187***	0.055***	0.018**	0.182***	0.048***	0.003
	(0.012)	(0.008)	(0.007)	(0.012)	(0.007)	(0.007)	(0.014)	(0.009)	(0.008)	(0.013)	(0.008)	(0.008)
Number of Children	0.028***	0.015***	0.014***	0.023***	0.012***	0.011***	0.031***	0.018***	0.016***	0.032***	0.018***	0.016***
	(0.004)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Child Away from Home	0.03	-0.017	-0.021*	0.026	-0.016	-0.019	0.01	-0.032	-0.037*	0.011	-0.03	-0.034*
	(0.019)	(0.013)	(0.013)	(0.019)	(0.013)	(0.013)	(0.027)	(0.020)	(0.020)	(0.027)	(0.020)	(0.019)
Entrepreneur	-0.027***	-0.037***	-0.033***	-0.030***	-0.035***	-0.031***	-0.076***	-0.085***	-0.082***	-0.083***	-0.093***	-0.087***
	(0.008)	(0.006)	(0.005)	(0.007)	(0.005)	(0.005)	(0.008)	(0.006)	(0.006)	(0.009)	(0.007)	(0.007)
ln(Average Income)		0.069***			0.070***			0.082***			0.098***	
		(0.004)			(0.004)			(0.005)			(0.005)	
ln(Average Income)*First Decile			0.012			0.011			0.001			0.002
			(0.007)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Second Decile			0.030***			0.032***			0.023***			0.033***
			(0.007)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Third Decile			0.034***			0.033***			0.028***			0.035***
			(0.007)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Fourth Decile			0.033***			0.034***			0.029***			0.039***
			(0.007)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Fifth Decile			0.035***			0.035***			0.031***			0.040***
			(0.007)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Sixth Decile			0.036***			0.036***			0.032***			0.041***
			(0.007)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Seventh Decile			0.033***			0.033***			0.032***			0.041***
			(0.008)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Eighth Decile			0.035***			0.035***			0.032***			0.042***
			(0.007)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Ninth Decile			0.036***			0.036***			0.033***			0.042***
			(0.007)			(0.007)			(0.008)			(0.008)
ln(Average Income)*Tenth Decile			0.036***			0.036***			0.034***			0.043***
			(0.006)			(0.006)			(0.007)			(0.007)
Avg. Inc. <= Income < 2*Avg. Inc.		-0.421***	-0.403***		-0.420***	-0.401***		-0.523***	-0.497***		-0.523***	-0.489***
		(0.004)	(0.004)		(0.004)	(0.004)		(0.005)	(0.005)		(0.005)	(0.005)
2*Avg. Inc. <= Income < 3*Avg. Inc.		-1.444***	-1.381***		-1.480***	-1.421***		-1.734***	-1.662***		-1.841***	-1.752***
		(0.025)	(0.027)		(0.027)	(0.028)		(0.028)	(0.028)		(0.028)	(0.028)
3*Avg. Inc. <= Income		-2.404***	-2.341***		-2.437***	-2.377***		-2.739***	-2.678***		-2.857***	-2.774***
		(0.053)	(0.056)		(0.056)	(0.059)		(0.053)	(0.053)		(0.064)	(0.062)
Constant	-0.006	-0.575***	-0.170*	-0.073	-0.641***	-0.222**	-0.187**	-0.929***	-0.329***	-0.046	-1.008***	-0.310***
	(0.086)	(0.074)	(0.094)	(0.088)	(0.077)	(0.094)	(0.088)	(0.086)	(0.110)	(0.084)	(0.086)	(0.107)
Observations	244,436	243,172	243,172	249,157	247,864	247,864	237,853	236,548	236,548	243,702	242,360	242,360

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base year (inflated by the CPI for the tax calculation in the later year). All specifications include region and year dummies.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Three Year Difference, 1987-96: By Income Decile

	Gross Income	Total Income	Gross Taxable Income	Total Taxable Income
	(1)	(2)	(3)	(4)
Δln(1-τ)*Tenth Decile	0.460***	0.495***	0.577***	0.577***
	(0.068)	(0.067)	(0.092)	(0.091)
Δln(1-τ)*Ninth Decile	0.502**	0.525***	0.429*	0.338
	(0.201)	(0.200)	(0.249)	(0.249)
Δln(1-τ)*Eighth Decile	0.076	0.021	-0.311	-0.418*
	(0.185)	(0.160)	(0.250)	(0.220)
Δln(1-τ)*Seventh Decile	0.936**	1.002**	0.09	0.247
	(0.455)	(0.423)	(0.285)	(0.271)
Δln(1-τ)*Sixth Decile	0.917**	0.875***	0.604	1.272
	(0.442)	(0.335)	(0.378)	(0.885)
Δln(1-τ)*Bottom Half	0.496***	0.407***	0.202	0.015
	(0.151)	(0.135)	(0.200)	(0.179)
Married	0.038*	0.053***	-0.025**	-0.034**
	(0.022)	(0.020)	(0.013)	(0.013)
Age	0.227	0.304*	0.930***	0.604***
	(0.139)	(0.161)	(0.157)	(0.155)
Age Squared	-0.067***	-0.069***	-0.129***	-0.098***
	(0.013)	(0.015)	(0.015)	(0.015)
Sex of Primary Filer	0.001	-0.002	-0.014*	-0.008
	(0.008)	(0.008)	(0.008)	(0.008)
Itemizer	-0.017**	-0.028***	0.016*	-0.001
	(0.007)	(0.007)	(0.008)	(0.008)
Number of Children	0.015***	0.011***	0.015***	0.014***
	(0.003)	(0.003)	(0.003)	(0.003)
Child Away from Home	-0.023*	-0.021*	-0.036*	-0.035*
	(0.013)	(0.013)	(0.019)	(0.019)
Entrepreneur	-0.033***	-0.031***	-0.081***	-0.086***
	(0.006)	(0.005)	(0.006)	(0.006)
ln(Average Income)*First Decile	0.011	0.012*	0.005	0.008
	(0.008)	(0.007)	(0.009)	(0.009)
ln(Average Income)*Second Decile	0.030***	0.032***	0.026***	0.037***
	(0.008)	(0.007)	(0.009)	(0.008)
ln(Average Income)*Third Decile	0.034***	0.033***	0.031***	0.038***
	(0.007)	(0.007)	(0.008)	(0.008)
ln(Average Income)*Fourth Decile	0.032***	0.034***	0.032***	0.041***
	(0.007)	(0.007)	(0.008)	(0.008)
ln(Average Income)*Fifth Decile	0.035***	0.035***	0.033***	0.042***
	(0.007)	(0.007)	(0.008)	(0.008)
ln(Average Income)*Sixth Decile	0.035***	0.035***	0.034***	0.042***
	(0.007)	(0.007)	(0.008)	(0.008)
ln(Average Income)*Seventh Decile	0.032***	0.032***	0.034***	0.043***
	(0.008)	(0.008)	(0.008)	(0.008)
ln(Average Income)*Eighth Decile	0.035***	0.035***	0.034***	0.044***
	(0.007)	(0.007)	(0.008)	(0.008)
ln(Average Income)*Ninth Decile	0.036***	0.035***	0.035***	0.044***
	(0.007)	(0.007)	(0.008)	(0.008)
ln(Average Income)*Tenth Decile	0.036***	0.036***	0.036***	0.045***
	(0.006)	(0.006)	(0.007)	(0.007)
Avg. Inc. <= Income < 2*Avg. Inc.	-0.405***	-0.402***	-0.491***	-0.483***
	(0.006)	(0.005)	(0.006)	(0.007)
2*Avg. Inc. <= Income < 3*Avg. Inc.	-1.386***	-1.422***	-1.645***	-1.732***
	(0.030)	(0.031)	(0.028)	(0.029)
3*Avg. Inc. <= Income	-2.348***	-2.378***	-2.664***	-2.755***
	(0.061)	(0.064)	(0.053)	(0.062)
Constant	-0.167*	-0.219**	-0.345***	-0.326***
	(0.094)	(0.094)	(0.111)	(0.108)
Observations	243,172	247,864	236,548	242,360

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base year (inflated by the CPI for the tax calculation in the later year). All specifications include region and year dummies.

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

Table 7: Three Year Difference, 1987-96: Robustness Checks

	Gross Income			Total Income			Gross Taxable Income			Total Taxable Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(A) CWHS Subsample												
$\Delta\ln(1-\tau)$	0.714*	0.354	0.243	0.784**	0.457*	0.357	0.569	0.185	0.013	0.38	0.142	-0.025
	(0.406)	(0.285)	(0.284)	(0.381)	(0.268)	(0.268)	(0.520)	(0.363)	(0.360)	(0.470)	(0.336)	(0.334)
Observations	20,341	20,331	20,331	21,250	21,238	21,238	19,912	19,897	19,897	20,931	20,914	20,914
(B) $10,000 Cutoff												
$\Delta\ln(1-\tau)$	0.465***	0.359***	0.281***	0.455***	0.361***	0.277***	0.672***	0.343***	0.343***	0.628***	0.495***	0.393***
	(0.063)	(0.041)	(0.042)	(0.059)	(0.039)	(0.039)	(0.082)	(0.057)	(0.058)	(0.080)	(0.057)	(0.058)
Observations	341,650	339,795	339,795	358,992	357,074	357,074	322,824	321,009	321,009	339,935	338,133	338,133
(C) Not Controlling for Mean Reversion												
$\Delta\ln(1-\tau)$	0.693***	1.636***	1.199***	0.715***	1.537***	1.147***	0.755***	1.691***	1.229***	0.710***	1.658***	1.175***
	(0.087)	(0.118)	(0.108)	(0.083)	(0.112)	(0.103)	(0.103)	(0.131)	(0.117)	(0.103)	(0.132)	(0.120)
Observations	244,436	243,172	243,172	249,157	247,864	247,864	237,853	236,548	236,548	243,702	242,360	242,360
(D) Controlling for ln(Income)												
$\Delta\ln(1-\tau)$	0.693***	-0.190***	-0.222***	0.715***	-0.209***	-0.250***	0.755***	-0.290***	-0.322***	0.710***	-0.314***	-0.362***
	(0.087)	(0.073)	(0.073)	(0.083)	(0.069)	(0.068)	(0.103)	(0.094)	(0.093)	(0.103)	(0.096)	(0.096)
Observations	244,436	244,436	244,436	249,157	249,157	249,157	237,853	237,853	237,853	243,702	243,702	243,702

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base year (inflated by the CPI for the tax calculation in the later year). All specifications include all demographic variables included in previous specifications, as well as region and
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Three Year Difference, 1989,1992, and 1995

	Gross Income			Total Income			Gross Taxable Income			Total Taxable Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Δln(1-τ)	0.878***	0.910***	0.773***	0.902***	0.851***	0.724***	0.994***	0.936***	0.790***	1.047***	1.041***	0.866***
	(0.200)	(0.201)	(0.187)	(0.190)	(0.182)	(0.168)	(0.236)	(0.243)	(0.229)	(0.255)	(0.272)	(0.257)
Married	0.196***	0.028	0.012	0.223***	0.047*	0.027	0.138***	-0.022	-0.044**	0.130***	-0.034	-0.061***
	(0.047)	(0.026)	(0.027)	(0.045)	(0.025)	(0.025)	(0.039)	(0.023)	(0.023)	(0.036)	(0.021)	(0.021)
Age/100	-0.438	-0.122	-0.115	-0.421	0.113	0.102	-0.201	0.524*	0.540**	-0.986***	0.088	0.128
	(0.368)	(0.236)	(0.230)	(0.354)	(0.239)	(0.233)	(0.427)	(0.278)	(0.274)	(0.382)	(0.265)	(0.262)
Age Squared/1000	-0.055	-0.050**	-0.047**	-0.041	-0.067***	-0.063***	-0.075*	-0.112***	-0.110***	0.012	-0.067***	-0.068***
	(0.038)	(0.023)	(0.022)	(0.035)	(0.023)	(0.022)	(0.043)	(0.027)	(0.027)	(0.037)	(0.025)	(0.025)
Sex of Primary Filer	-0.027	-0.005	-0.002	-0.036	-0.007	-0.004	-0.054*	-0.016	-0.011	-0.048*	-0.009	-0.004
	(0.021)	(0.013)	(0.013)	(0.023)	(0.013)	(0.013)	(0.028)	(0.014)	(0.014)	(0.027)	(0.013)	(0.013)
Itemizer	0.140***	0.000	-0.030**	0.136***	-0.004	-0.034***	0.184***	0.038***	-0.003	0.200***	0.049***	-0.001
	(0.022)	(0.012)	(0.012)	(0.023)	(0.012)	(0.012)	(0.025)	(0.014)	(0.014)	(0.025)	(0.014)	(0.014)
Number of Children	0.024***	0.015***	0.014***	0.019***	0.011***	0.011***	0.026***	0.016***	0.015***	0.027***	0.017***	0.016***
	(0.007)	(0.004)	(0.003)	(0.007)	(0.003)	(0.003)	(0.008)	(0.005)	(0.005)	(0.008)	(0.005)	(0.005)
Child Away from Home	0.045	-0.009	-0.012	0.04	-0.012	-0.014	0.01	-0.035	-0.038	0.009	-0.039	-0.04
	(0.031)	(0.022)	(0.021)	(0.031)	(0.021)	(0.021)	(0.045)	(0.034)	(0.033)	(0.045)	(0.034)	(0.033)
Entrepreneur	-0.004	-0.039***	-0.032***	-0.002	-0.036***	-0.028***	-0.051***	-0.083***	-0.076***	-0.051***	-0.088***	-0.078***
	(0.014)	(0.009)	(0.009)	(0.014)	(0.008)	(0.008)	(0.016)	(0.011)	(0.011)	(0.016)	(0.011)	(0.011)
ln(Average Income)		0.111***			0.106***			0.121***			0.137***	
		(0.012)			(0.011)			(0.013)			(0.015)	
ln(Average Income)*First Decile			0.046***			0.047***			0.035**			0.042***
			(0.014)			(0.013)			(0.016)			(0.015)
ln(Average Income)*Second Decile			0.070***			0.071***			0.063***			0.077***
			(0.013)			(0.013)			(0.015)			(0.015)
ln(Average Income)*Third Decile			0.076***			0.074***			0.069***			0.079***
			(0.013)			(0.013)			(0.015)			(0.015)
ln(Average Income)*Fourth Decile			0.075***			0.074***			0.070***			0.083***
			(0.013)			(0.013)			(0.015)			(0.015)
ln(Average Income)*Fifth Decile			0.077***			0.076***			0.072***			0.085***
			(0.013)			(0.013)			(0.015)			(0.015)
ln(Average Income)*Sixth Decile			0.077***			0.076***			0.073***			0.085***
			(0.013)			(0.013)			(0.015)			(0.015)
ln(Average Income)*Seventh Decile			0.075***			0.074***			0.073***			0.085***
			(0.013)			(0.013)			(0.015)			(0.015)
ln(Average Income)*Eighth Decile			0.076***			0.075***			0.072***			0.085***
			(0.013)			(0.013)			(0.015)			(0.015)
ln(Average Income)*Ninth Decile			0.077***			0.076***			0.073***			0.085***
			(0.013)			(0.013)			(0.014)			(0.015)
ln(Average Income)*Tenth Decile			0.076***			0.075***			0.074***			0.085***
			(0.012)			(0.012)			(0.014)			(0.014)
Avg. Inc. <= Income < 2*Avg. Inc.		-0.446***	-0.423***		-0.442***	-0.418***		-0.556***	-0.527***		-0.559***	-0.523***
		(0.009)	(0.008)		(0.008)	(0.008)		(0.011)	(0.010)		(0.011)	(0.010)
2*Avg. Inc. <= Income < 3*Avg. Inc.		-1.608***	-1.520***		-1.575***	-1.498***		-1.933***	-1.855***		-1.999***	-1.905***
		(0.046)	(0.043)		(0.045)	(0.042)		(0.066)	(0.065)		(0.068)	(0.066)
3*Avg. Inc. <= Income		-2.584***	-2.502***		-2.678***	-2.597***		-2.847***	-2.773***		-2.916***	-2.823***
		(0.105)	(0.108)		(0.109)	(0.111)		(0.115)	(0.114)		(0.116)	(0.114)
Constant	-0.054	-0.908***	-0.493***	-0.103	-0.969***	-0.582***	-0.051	-1.084***	-0.508***	0.151	-1.122***	-0.509***
	(0.139)	(0.156)	(0.166)	(0.138)	(0.157)	(0.164)	(0.125)	(0.169)	(0.186)	(0.116)	(0.178)	(0.182)
Observations	69,285	68,926	68,926	70,744	70,376	70,376	67,420	67,062	67,062	69,162	68,793	68,793

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base year (inflated by the CPI for the tax calculation in the later year). All specifications include region and year dummies.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: Three Year Difference, 1987-96: Accounting for Shifting

	Gross Income			Total Income			Gross Taxable Income			Total Taxable Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(A) $\Delta\ln(1-\tau_t)$	0.475***	0.569***	1.501***	0.485***	0.595***	1.516***	0.466***	0.597***	1.703***	0.437***	0.591***	1.714***
	(0.060)	(0.067)	(0.164)	(0.057)	(0.064)	(0.157)	(0.077)	(0.085)	(0.199)	(0.077)	(0.087)	(0.197)
(B) $\Delta\ln(1-\tau_{t+1})$		-0.624***	-0.822***		-0.676***	-0.880***		-0.814***	-1.003***		-0.862***	-1.058***
		(0.041)	(0.056)		(0.040)	(0.054)		(0.040)	(0.062)		(0.039)	(0.061)
(C) $\Delta\ln(1-\tau_{t-1})$			-0.992***			-1.021***			-1.191***			-1.241***
			(0.066)			(0.063)			(0.071)			(0.068)
(A) + (B) + (C)	0.475***	-0.055	-0.313***	0.485***	-0.080	-0.384***	0.466***	-0.216***	-0.491***	0.437***	-0.271***	-0.585***
	(0.060)	(0.054)	(0.084)	(0.057)	(0.051)	(0.080)	(0.077)	(0.070)	(0.108)	(0.077)	(0.070)	(0.108)
Observations	243,172	208,625	170,929	247,864	212,329	174,163	236,548	203,111	166,155	242,360	207,844	170,181

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base yea (inflated by the CPI for the tax calculation in the later year). All specifications include all demographic variables included in previous specifications, as well as region and year dummies.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10: Three Year Difference, 1987-96: Accounting for Shifting Robustness Checks

	Gross Income			Total Income			Gross Taxable Income			Total Taxable Income		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(A) CWHS Subsample												
(A) $\Delta\ln(1-\tau_t)$	0.243	0.26	1.343***	0.357	0.424	1.569***	0.013	-0.003	1.084***	-0.025	-0.012	1.067***
	(0.284)	(0.306)	(0.355)	(0.268)	(0.294)	(0.353)	(0.360)	(0.397)	(0.391)	(0.334)	(0.375)	(0.355)
(B) $\Delta\ln(1-\tau_{t+1})$		-0.779***	-0.998***		-0.877***	-1.099***		-0.685***	-0.826***		-0.701***	-0.837***
		(0.151)	(0.146)		(0.144)	(0.139)		(0.122)	(0.117)		(0.117)	(0.114)
(C) $\Delta\ln(1-\tau_{t-1})$			-1.068***			-1.176***			-0.920***			-1.019***
			(0.172)			(0.168)			(0.133)			(0.119)
(A) + (B) + (C)	0.243	-0.520**	-0.723***	0.357	-0.453*	-0.706***	0.013	-0.687**	-0.662***	-0.025	-0.713**	-0.788***
	(0.284)	(0.258)	(0.228)	(0.268)	(0.243)	(0.222)	(0.360)	(0.312)	(0.231)	(0.334)	(0.291)	(0.213)
Observations	20,331	17,578	14,607	21,238	18,331	15,258	19,897	17,218	14,288	20,914	18,075	15,025
(B) $10,000 Cutoff												
(A) $\Delta\ln(1-\tau_t)$	0.281***	0.418***	1.265***	0.277***	0.445***	1.278***	0.343***	0.483***	1.398***	0.393***	0.563***	1.655***
	(0.042)	(0.049)	(0.105)	(0.039)	(0.045)	(0.097)	(0.058)	(0.066)	(0.133)	(0.058)	(0.067)	(0.138)
(B) $\Delta\ln(1-\tau_{t+1})$		-0.651***	-0.849***		-0.710***	-0.913***		-0.830***	-0.996***		-0.954***	-1.166***
		(0.029)	(0.039)		(0.027)	(0.037)		(0.031)	(0.045)		(0.031)	(0.046)
(C) $\Delta\ln(1-\tau_{t-1})$			-1.033***			-1.069***			-1.163***			-1.344***
			(0.044)			(0.041)			(0.049)			(0.049)
(A) + (B) + (C)	0.281***	-0.233***	-0.617***	0.277***	-0.266***	-0.705***	0.343***	-0.347***	-0.762***	0.393***	-0.391***	-0.854***
	(0.042)	(0.039)	(0.054)	(0.039)	(0.035)	(0.049)	(0.058)	(0.054)	(0.074)	(0.058)	(0.053)	(0.075)
Observations	339,795	289,334	237,094	357,074	303,115	248,734	321,009	273,865	223,873	338,133	287,904	235,522
(C) Not Controlling for Mean Reversion												
(A) $\Delta\ln(1-\tau_t)$	1.199***	1.410***	3.719***	1.147***	1.377***	3.581***	1.229***	1.473***	3.995***	1.175***	1.459***	3.906***
	(0.108)	(0.124)	(0.400)	(0.103)	(0.119)	(0.374)	(0.117)	(0.132)	(0.413)	(0.120)	(0.136)	(0.401)
(B) $\Delta\ln(1-\tau_{t+1})$		-1.092***	-1.557***		-1.127***	-1.583***		-1.321***	-1.776***		-1.360***	-1.800***
		(0.071)	(0.121)		(0.068)	(0.115)		(0.060)	(0.117)		(0.058)	(0.113)
(C) $\Delta\ln(1-\tau_{t-1})$			-1.831***			-1.839***			-1.979***			-2.007***
			(0.151)			(0.144)			(0.132)			(0.126)
(A) + (B) + (C)	1.199***	0.317***	0.331*	1.147***	0.249***	0.158	1.229***	0.152	0.239	1.175***	0.099	0.099
	(0.108)	(0.092)	(0.186)	(0.103)	(0.088)	(0.172)	(0.117)	(0.109)	(0.217)	(0.120)	(0.111)	(0.212)
Observations	243,172	208,625	170,929	247,864	212,329	174,163	236,548	203,111	166,155	242,360	207,844	170,181
(D) Controlling for ln(Income)												
(A) $\Delta\ln(1-\tau t)$	-0.222***	-0.053	0.003	-0.250***	-0.062	-0.025	-0.322***	-0.146*	-0.022	-0.362***	-0.178**	-0.052
	(0.073)	(0.069)	(0.129)	(0.068)	(0.065)	(0.119)	(0.093)	(0.084)	(0.148)	(0.096)	(0.088)	(0.155)
(B) $\Delta\ln(1-\tau t+1)$		-0.753***	-0.744***		-0.781***	-0.771***		-0.973***	-0.949***		-1.006***	-0.976***
		(0.049)	(0.053)		(0.046)	(0.050)		(0.043)	(0.055)		(0.043)	(0.055)
(C) $\Delta\ln(1-\tau t-1)$			-0.811***			-0.825***			-0.965***			-1.012***
			(0.068)			(0.064)			(0.061)			(0.058)
(A) + (B) + (C)	-0.222***	-0.806***	-1.551***	-0.250***	-0.843***	-1.621***	-0.322***	-1.119***	-1.936***	-0.362***	-1.184***	-2.041***
	(0.073)	(0.059)	(0.077)	(0.068)	(0.056)	(0.073)	(0.093)	(0.075)	(0.096)	(0.096)	(0.076)	(0.097)
Observations	244,436	209,550	171,704	249,157	213,270	174,958	237,853	204,112	166,979	243,702	208,870	171,028

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base year (inflated by the CPI for the tax calculation in the later year). All specifications include all demographic variables included in previous specifications, as well as region and year dummies.

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

Table 11: Three Year Difference, All Years 1987-96: Shifting By Income Decile

	Gross Income		Total Income		Gross Taxable Income		Total Taxable Income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(A) $\Delta\ln(1-\tau_t)$*								
Tenth Decile	0.561***	1.475***	0.598***	1.502***	0.760***	2.046***	0.762***	2.094***
	(0.077)	(0.240)	(0.076)	(0.237)	(0.106)	(0.342)	(0.105)	(0.341)
Ninth Decile	0.598***	2.100***	0.679***	2.079***	0.532**	2.211***	0.466*	1.895***
	(0.212)	(0.520)	(0.218)	(0.527)	(0.267)	(0.590)	(0.274)	(0.584)
Eighth Decile	0.114	0.558	0.046	0.291	-0.199	0.072	-0.308	-0.152
	(0.182)	(0.399)	(0.152)	(0.311)	(0.250)	(0.542)	(0.220)	(0.452)
Seventh Decile	1.010**	2.21	1.038**	2.127	0.06	0.144	0.172	0.4
	(0.513)	(1.476)	(0.474)	(1.305)	(0.283)	(0.497)	(0.271)	(0.506)
Sixth Decile	0.865*	2.287	0.918**	2.450*	0.593	1.798**	1.43	4.389
	(0.480)	(1.449)	(0.375)	(1.303)	(0.384)	(0.881)	(0.990)	(2.848)
Bottom Half	0.601***	0.802***	0.546***	0.884***	0.29	0.630*	0.167	0.598*
	(0.169)	(0.258)	(0.155)	(0.240)	(0.219)	(0.342)	(0.200)	(0.311)
(B) $\Delta\ln(1-\tau_{t+1})$*								
Tenth Decile	-0.631***	-0.815***	-0.638***	-0.824***	-1.019***	-1.256***	-1.001***	-1.247***
	(0.059)	(0.092)	(0.058)	(0.090)	(0.080)	(0.128)	(0.078)	(0.127)
Ninth Decile	-0.776***	-1.125***	-0.790***	-1.099***	-1.017***	-1.311***	-0.990***	-1.210***
	(0.113)	(0.195)	(0.114)	(0.193)	(0.132)	(0.207)	(0.131)	(0.200)
Eighth Decile	-0.503***	-0.607***	-0.532***	-0.609***	-0.633***	-0.643***	-0.666***	-0.691***
	(0.096)	(0.134)	(0.092)	(0.123)	(0.104)	(0.141)	(0.097)	(0.128)
Seventh Decile	-1.067**	-1.085**	-1.099**	-1.115**	-0.663***	-0.493***	-0.678***	-0.568***
	(0.517)	(0.495)	(0.482)	(0.450)	(0.156)	(0.159)	(0.146)	(0.154)
Sixth Decile	-0.460***	-0.819**	-0.535***	-0.912***	-0.630***	-0.884***	-0.946***	-1.579**
	(0.164)	(0.393)	(0.125)	(0.334)	(0.136)	(0.235)	(0.285)	(0.703)
Bottom Half	-0.570***	-0.643***	-0.653***	-0.763***	-0.589***	-0.623***	-0.691***	-0.748***
	(0.056)	(0.073)	(0.056)	(0.074)	(0.064)	(0.084)	(0.062)	(0.081)
(C) $\Delta\ln(1-\tau_{t-1})$*								
Tenth Decile		-0.771***		-0.766***		-1.002***		-1.062***
		(0.083)		(0.081)		(0.126)		(0.125)
Ninth Decile		-1.429***		-1.419***		-1.713***		-1.687***
		(0.198)		(0.193)		(0.240)		(0.232)
Eighth Decile		-0.800***		-0.754***		-0.885***		-0.818***
		(0.122)		(0.113)		(0.154)		(0.142)
Seventh Decile		-1.718**		-1.691**		-0.761***		-0.849***
		(0.865)		(0.776)		(0.174)		(0.174)
Sixth Decile		-1.157**		-1.235***		-1.409***		-2.221***
		(0.464)		(0.395)		(0.377)		(0.855)
Bottom Half		-0.850***		-0.922***		-1.044***		-1.087***
		(0.082)		(0.082)		(0.103)		(0.092)
(A) + (B) + (C)								
Tenth Decile	-0.070	-0.111	-0.040	-0.087	-0.259***	-0.213	-0.239***	-0.216
	(0.064)	(0.115)	(0.062)	(0.112)	(0.085)	(0.169)	(0.084)	(0.165)
Ninth Decile	-0.178	-0.454**	-0.110	-0.439*	-0.486**	-0.813***	-0.524**	-1.002***
	(0.148)	(0.217)	(0.150)	(0.228)	(0.204)	(0.286)	(0.212)	(0.296)
Eighth Decile	-0.389**	-0.849***	-0.486***	-1.072***	-0.831***	-1.456***	-0.974***	-1.661***
	(0.163)	(0.254)	(0.135)	(0.195)	(0.248)	(0.383)	(0.211)	(0.311)
Seventh Decile	-0.056	-0.592	-0.062	-0.679	-0.603**	-1.110***	-0.506*	-1.017***
	(0.288)	(0.440)	(0.271)	(0.436)	(0.280)	(0.371)	(0.264)	(0.368)
Sixth Decile	0.405	0.311	0.383	0.303	-0.037	-0.495	0.484	0.588
	(0.342)	(0.631)	(0.276)	(0.608)	(0.324)	(0.385)	(0.728)	(1.337)
Bottom Half	0.031	-0.692***	-0.108	-0.800***	-0.299*	-1.037***	-0.524***	-1.237***
	(0.138)	(0.149)	(0.122)	(0.131)	(0.180)	(0.202)	(0.164)	(0.183)
Observations	208,625	170,929	212,329	174,163	203,111	166,155	207,844	170,181

Notes: Robust standard errors are in parentheses. The change in the net of tax rate is instrumented in all specifications with the change in net of tax rate evaluated at the level of income in the base year (inflated by the CPI for the tax calculation in the later year). All specifications include all demographic variables included in previous specifications, as well as region and year dummies.
* significant at 10%; ** significant at 5%; *** significant at 1%