DO TAXPAYERS REALLY RESPOND TO CHANGES IN TAX RATES? EVIDENCE FROM THE 1993 TAX ACT

by

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OTA Working Paper 79 **November 1998**

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I thank Jim Cilke for help in the development of the data and tax calculators, and Pete Sailer for help in the development of the occupation codes. I also thank David Cutler, Martin Feldstein, Austan Goolsbee, David Joulfaian, Doug Holtz-Eakin, Erik Larson, Bruce Meyer, Mark Rider, Karl Scholz, Joel Slemrod, Jerry Tempalski, and participants in the 1998 UNC Tax Conference, Harvard-MIT Public Finance Seminar, and 1997 NBER Summer Institute Seminar in Public Finance for many helpful comments on earlier versions of this paper. Views expressed do not necessarily represent the views or policies of the Department of the Treasury. Remaining errors are my own.

ABSTRACT

An emerging literature in public finance has found taxable income to be responsive to tax rates. The high elasticities reported by this literature suggest that both a large deadweight loss is associated with the current progressive income tax and the higher income tax rates enacted in 1993 may not have produced additional revenues. This paper estimates the responsiveness of taxpayer incomes to the higher tax rates enacted in 1990 and 1993 and simulates the effect of the estimated behavioral response on revenues from the 1993 Act. In contrast to the previous literature, this paper uses a panel consisting of annual tax returns and a panel that spans a period when tax rates increased. This paper also uses a proxy of taxpayers' permanent income to estimate the permanent taxable income response holding a variety of taxpayer characteristics constant. The findings indicate a taxable income elasticity with respect to taxpayers' net-of-tax rate of about 0.4, below the elasticities reported by most earlier studies, but above zero. Simulations indicate that the higher individual income tax rates under the 1993 Tax Act may have reduced the static revenue gain by as much as 39 percent. The reduction in the static revenue gain, however, could have been as little as 13 percent depending on whether the behavioral response reduced aggregate income or reflected reshuffling of income from high-tax to low-tax activities.

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Do Taxpayers Really Respond to Changes in Tax Rates? Evidence from the 1993 Tax Act

"A tax may either take out or keep out of the pockets of the people a great deal more than it brings into the public treasury ... [I]t may obstruct the industry of the people, and discourage them from applying to certain branches of business which might give maintenance and employment to great multitudes." Adam Smith, *The Wealth of Nations*

I. Introduction

An emerging literature in public economics attempts to estimate the overall response of taxpayers' incomes to tax rate changes. Whether and to what extent taxpayers alter their incomes in response to changes in tax rates figured heavily in the debate over whether to increase federal income tax rates in 1993. Some argued that the higher tax rates would not produce the revenues forecast by government economists and would result in a significant deadweight loss because taxpayers would respond by reducing their taxable incomes (Feenberg and Feldstein, 1993). Reports of the recent surge in federal individual income tax receipts, however, has cast in doubt the possibility of a substantial behavioral response following the 1993 Act.

Most of the research on the taxable income response has used the tax rate reductions of the 1980s as so-called "natural experiments" where the differential effects of exogenous policy changes are used to estimate the tax-induced behavioral response. These studies focus on a taxpayer's taxable income because changes in taxable income will reflect a broad range of possible behavioral responses including changes in labor supply and participation, savings and portfolio allocation, the form of compensation, the timing of income and deductions, and tax evasion and avoidance. Also, taxable income is most closely related to tax liability and revenue and, according to Feldstein (1995), the dead-weight loss of tax changes. This research has generally found evidence of a substantial behavioral response reporting elasticities of taxable income with respect

to the net-of-tax rate sometime exceeding one (Lindsey, 1987; Feldstein, 1995a; Navratil, 1994; Auten and Carroll, 1997).

These findings, however, have been cast in doubt by the claim that the substantial rise in taxpayer incomes during the 1980s, although coincident with the tax rate reductions, may simply have been the result of longer term trends affecting the overall distribution of income, but unrelated to the tax changes (Goolsbee, 1997; Auerbach and Slemrod, 1997; Gravelle, 1993). The large elasticities reported by these studies may, therefore, have been the result of the spurious correlation between the income changes and the longer term trends having little or nothing to do with changes in tax rates. Two recent papers by Goolsbee (1997) and Sammartino and Weiner (1997), which avoid this criticism by focusing on a period where tax rates increased, suggest that most of the behavioral response associated with the 1993 Act can be attributed to changes in the timing of income and deductions rather than a permanent response.

In this paper, I present evidence that the taxable income response associated with the 1993 Tax Act is substantially larger than previous studies of the 1993 Act indicate, but below the estimates reported by the earlier research of the tax rate reductions of the 1980s. Similar to earlier research, this paper compares the income changes of higher income taxpayers to the income changes of moderate income taxpayers in the presence of the change in the relative taxation of these two groups. But, unlike earlier research, this paper uses a proxy of taxpayers' permanent tax rates and the exogenous policy shift in the tax rate schedule to estimate their permanent response. Distinguishing between the permanent and transitory response is important, because, as shown elsewhere, there can be significant differences between permanent and transitory responses. Finally, this paper uses a new panel of annual tax returns spanning both the

tax rate increases in 1990 and 1993. Unlike most previous studies, this panel contains many high income returns, and, by focusing on annual income changes, includes both periods with and without changes in tax rates.

Focusing on the 1990 and 1993 Acts also offers other advantages for estimating the responsiveness of taxpayers to tax rates changes relative to the studies of the tax reforms of the 1980s. First, the 1990 and 1993 Acts increased tax rates primarily on high income taxpayers, but not taxpayers with low and moderate incomes. Because the change in after-tax incomes of many taxpayers facing the higher rates were small even though their marginal tax rates were significantly increased, income effects are likely to be less important in influencing behavior relative to earlier reforms. Second, the 1986 Tax Reform Act not only decreased marginal tax rates for most taxpayers, but also increased capital gains tax rates, raised taxes on corporations relative to other business organizational forms, and involved significant changes in the tax base. In contrast, the 1993 Act involved no change in the statutory rate on capital gains realizations, and changes in the tax base and in the relative advantage of pass-through status were considerably less significant compared to earlier tax reforms. Finally, as pointed out by Slemrod (1994), the tax planning opportunities and technologies used by taxpayers to evade or avoid taxes may vary significantly over time and responses may also depend on the direction of the tax change.

The findings reported below indicate a tax-induced behavioral response that is positive and significant, but considerably smaller than reported elsewhere. The estimate of the gross income elasticity with respect to the tax price (or net-of-tax rate) is about 0.3, while the taxable income elasticity is closer to 0.4. These estimates are generally robust to alternate specifications. Also, based on simulations of the higher individual income tax rates enacted as part of the 1993 Tax

Act, the tax-induced behavioral response may have reduced the static revenue gain by as much as 39 percent or as little as 13 percent. The exact magnitude of the "revenue offset" depends on the extent to which the reduction in taxable income by taxpayers facing the higher tax rates was shifted to lower taxed activities or taxpayers, or resulted in a reduction in aggregate taxable income.

Section II of the paper describes the major features of the 1990 and 1993 Acts. Section III describes trends in reported income from the panel developed for this paper. Section IV presents the empirical model and data used to estimate the permanent response of taxpayers' incomes to changes in taxpayers' net-of-tax rate. The results are presented in Section V, and Section VI concludes the paper.

II. The 1990 and 1993 Tax Acts

Both the 1990 and the 1993 Acts increased individual income tax rates. The 1990 Act increased income tax rates for higher income taxpayers by: (1) increasing the top tax rate from 28 percent to 31 percent, (2) phasing-out personal exemptions (PEP), and (3) limiting itemized deductions (Pease). The Act also increased the AMT rate from 21 percent to 24 percent and increased the cap on wages subject to the 1.45 percent tax (2.9 percent including both the employee and employer share) for Hospital Insurance (Part A of Medicare) from $53,400 to $125,000 for 1991.

The 1993 Act increased income taxes on higher income taxpayers by adding a new 36 percent rate bracket for joint filers with incomes exceeding $140,000 (indexed) and single filers with incomes exceeding $115,000 (indexed) and a 10 percent surtax for high income taxpayers

with incomes exceeding $250,000 (indexed) in 1993. The surtax had the effect of adding a new 39.6 percent top statutory rate. The 1993 Act also permanently extended the phase-out of the personal exemption and the limitation on itemized deductions, increased the single 24 percent AMT rate to a two tiered AMT with a maximum rate of 28 percent, and, effective in 1994, repealed the cap on wages subject to the 1.45 percent tax (2.9 percent including both the employee and employer share) for Hospital Insurance (Part A of Medicare).[1]

Estimated tax price elasticities from the 1990s are important because the tax rate increases in 1990 and 1993 move in the opposite direction of the rate reductions of the 1980s. The literature on income dynamics has considered the influence of long-term trends affecting the shape of the income distribution over several decades. This literature has, for example, considered the role played by numerous nontax factors including increased international trade, technological change, changing returns to human capital, and the declining strength of unions.[2] Determining whether high income taxpayers responded to the 1990 and 1993 tax rate increases by lowering their incomes will also help determine whether the substantial elasticities estimated from the tax reductions of the 1980s result from a spurious correlation between the tax reductions and the longer term trends affecting the shape of the income distribution, but having nothing to do with the tax rate reductions.

Recent data indicate that the widening gap between the share of income reported by high

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[1]The 1993 Act also made moving expenses deductible above the line instead of as an itemized deduction, increased the fraction of Social Security benefits includable in income from 50 percent to 85 percent for higher income taxpayers, and expanded the EITC for low income workers. The top statutory corporate tax rate was increased from 34 percent to 35 percent and the deduction for wages paid to highly compensated employees was restricted to $1 million.

[2]See, for example, the series of articles by Gottschalk (1997), Johnson (1997), Topel (1997), and Fortin and Lemieux (1997).

and low income taxpayers has continued. The change in the shape of the income distribution has been at least one source of the rise in government receipts and falling deficits during the past several years. These trends, depicted in Table 1, might seem at odds with the notion that taxpayers reduced their incomes in response to rate increases of the 1990s. Indeed, Table 1 shows that the income share reported by taxpayers with incomes over $200,000 rose between 1989 and 1995 from 13.0 percent to 14.0 percent.[3]

Table 1 also shows, however, that the average real incomes of taxpayers in the top income class fell during this period. The decline in average incomes between 1989 and 1995 suggests that movement of taxpayers from lower to higher income classes, rather than the rise in the incomes of taxpayers already classified as high income may explain the rising income shares of the high income. Although not shown in Table 1, the number of taxpayers with incomes over $200,000 rose by 15 percent, from 0.812 million in 1989 to 0.933 million in 1995. Although these data point to income mobility as a possible explanation for the changes in the overall shape of the income distribution between 1989 and 1995, they are only suggestive because the *same* taxpayers are not followed over time.

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[3]These tabulations are based on an inflation-adjusted, constant law income concept to abstract from changes in the tax base and inflation. Constant law income is calculated by adding to and subtracting from a taxpayer's total income the income items included or excluded in selected years because of statutory changes in the definition of a taxpayer's total income. Adjustments are made by adding: (1) tax-exempt interest income, (2) untaxed pension benefits, (3) disallowed passive losses, (4) foreign income exclusion, and (5) depreciation in excess of straight-line depreciation, and subtracting: (1) Social Security benefits, (2) moving expenses, (3) unreimbursed employee business expenses, and (4) alimony paid. This income concept is similar to the concept used by the Statistics of Income Division for tabulations published in *Individual Income Tax Returns*, Publication 1034.

III. Trends from a Panel of Tax Returns

The panel developed for this paper is constructed from tax returns common to the Statistic of Income (SOI) Individual Income Tax files from 1989 through 1995.[4] The age, industry, and occupation of taxpayers are also included in these data.[5] This paper uses annual data from 1989 through 1995 to include periods both with and without tax changes, an important source of independent variation not incorporated into earlier studies of the tax rate reductions of the 1980s, which tend to compare data from a year before the tax change to a year after the tax change. The use of annual data is also important because income may be temporarily high or low in any single year and there is evidence of substantial year-to-year shifting of income and deductions in years immediately preceding and following the tax changes (see, for example, Parcell (1996), Platt (1997), and Goolsbee (1997)).[6]

This panel includes a large number of high income tax returns because the stratified sampling procedure used for SOI Individual Tax Files over samples tax returns with high incomes.

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[4]The SOI Individual Income Tax Files are annual stratified random samples of over 100,000 individual tax returns filed in each year. See IRS (1989) for a description of the 1989 sample procedure. Taxpayers who do not file on a calendar year basis (i.e., fiscal year filers), or whose tax return is for a year other than 1989 or 1995 are excluded from the panel. Taxpayers with two or more tax returns for a filing year, perhaps because of transcription errors of Social Security numbers during editing, are also excluded.

[5]The tax return data are supplemented with the age of the taxpayer using a match file provided by the Social Security Administration. The occupation classifications are based on the taxpayer-provided occupation description on the signature line of Form 1040 and the industry of a taxpayer's employer from W-2 Forms.

[6]Some income shifting from 1991 into 1990 occurred because of the higher income tax rates taking effect in 1991 and the increase in the wage cap for Health Insurance (Medicare) taxes to $125,000. Most of the transitory shifting of income around the 1993 Act involved the shifting of wages and bonus income from 1993 into 1992 as a result of the higher individual income tax rates taking effect in 1993, and additional shifting of wages and bonus income from 1994 into 1993 to avoid the repeal of the wage cap for Health Insurance (Medicare) taxes in 1994. Data for 1995 are probably the first year of data not influenced by income shifting.

The selection of tax returns for the panel, however, depends on whether a tax return is sampled for each of the annual SOI Individual Tax files from 1989 through 1995. The sampling procedure used for the annual SOI files has the effect of including in the panel all taxpayers who remain in the same sample strata or move to a sample strata with a higher sampling rate. Taxpayers who move to a sample strata with a lower sampling rate have a lower probability of remaining in a subsequent SOI Individual Tax File and being included in the panel and are, therefore, underrepresented. This paper relies on a weighting procedure suggested by Hausman and Wise (1981) and Hinkins et al (1988) that corrects for the endogenous sample selection by weighting all observations by the inverse of the effective selection probability (i.e., the maximal weight over the years included in the panel). Weighting the data by the maximal weight compensates for the underrepresentation of taxpayers with income declines.[7]

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[7]The panel is constructed from the overlap or intersection of the 1989 through 1995 SOI Individual Tax Files. For illustrative purposes, however, the weights can be derived for a two year panel without loss of generality for longer overlap panels. In the case of, for example, an overlap panel drawn from the 1989 and 1990 SOI files, the probably that a taxpayer would be drawn into the panel is given by the law of conditional probabilities as,

$$P\left(89 \cap 90\right) \equiv P_i^{89} \cdot \left(P_i^{90} | P_i^{89}\right)$$

The probability that a taxpayer is sampled in 1989, P_i^{89}, depends on 1989 income and tax schedules. The probability that a taxpayer is also sampled in 1990, $P_i^{90} \mid P_i^{89}$, depends on both 1989 and 1990 income and tax schedules. This sampling probability is one if the taxpayer's income rose or remained the same between 1989 and 1990, assuming all other stratification criteria were unchanged. If the taxpayer's income, however, declined, this sampling probability will be less than one, assuming all other stratification criteria are unchanged. Thus, whether a taxpayer is sampled in 1990 is conditional on being sampled in 1989 and depends on both their 1989 and 1990 characteristics (i.e., income and tax schedules). The appropriate weight is the inverse of the probability that a taxpayer is sampled in both years (i.e., the inverse of the product of these two probabilities shown in the above equation), which can be calculated as the maximum of the 1989 and 1990 Individual Tax File sampling weights. An appendix providing a detailed description of the sampling design of the SOI Individual Tax Files and the construction of the weights used in this paper is available upon request.

Table 2 presents tabulations from the panel where taxpayers are classified based on their: (1) 1989 income, (2) 1995 income (in 1989$), and (3) average income from 1989 through 1995 (in 1989$). These tabulations are restricted to particular taxpayers because of data limitations and to abstract from taxpayer characteristics that are not likely to be related to tax-induced behavioral responses, but that affect a taxpayer's reported income.[8] For example, the analysis is restricted to joint filers with the same marital status in all years to avoid fluctuations in income related to marriage, or family dissolution due to divorce or death of spouse.[9] To abstract from the effect of the two Acts on retirement decisions, taxpayers who are over age 55 in 1989 (and 61 in 1995) are excluded. Taxpayers under age 25 in 1989 are excluded because income changes for many of these taxpayers reflect the completion of schooling and entry into the work force.[10]

Taxpayers who are on the alternative minimum tax (AMT) in any year are also excluded. Although these taxpayers had relatively low marginal tax rates (e.g., in 1989 the AMT rate was 21 percent), the 1990 and 1993 Acts substantially increased the AMT rate, first to 24 percent in 1991 and then to a maximum 28 percent in 1993. The 1993 Act also increased the AMT exemption amounts somewhat. Taxpayers with AMT liability tend to have average tax rates that

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[8]In most cases, the sample restrictions are based on 1989 characteristics because the post-tax change characteristics can be affected by how a taxpayer responded to the tax changes and, therefore, can be endogenous in a way pre-tax change value are not. For example, whether a taxpayer is subject to the AMT in 1995 will, in part, depend on how the taxpayer responded to the 1990 and 1993 Acts. Nevertheless, in robustness tests presented below these sample restrictions are relaxed or are applied symmetrically based on characteristics in each year.

[9]Tax returns with a change in their secondary Social Security number are also excluded because the household is no longer composed of the same individuals, which may indicate the taxpayer divorced and remarried between 1989 and 1995.

[10]Taxpayers who are identified as deceased, retired, or as students based on information from each taxpayer's self-described 1993 occupation are also excluded. The construction of the occupation codes is discussed in greater detail below.

are high relative to other taxpayers. Deleting AMT taxpayers avoids the difficulty of distinguishing between differences in the effect of marginal tax rate changes and average tax rate changes.[11]

The first panel in Table 2 shows that the share of income reported by high income taxpayers in 1989 *declined* over the period. The share of income reported by taxpayers reporting more than $200,000 fell from 14.5 percent to 12.7 percent between 1989 and 1995. The drop in the income share for this group between 1989 and 1990 is likely the result of the 1990-91 recession. The continued drop off between 1990 and 1991 could also be the result of the recession or income shifting from 1991 into 1990 as a result of the rise in the top statutory rate from 28 percent to 31 percent under the 1990 Act. The decline in the income share between 1992 and 1993 is consistent with income shifting due to the higher individual tax rates enacted in the 1993 Act. The continued drop off between 1993 and 1994 is consistent with income shifting because of the repeal of the wage cap on Medicare (Part A) taxes enacted in the 1993 Act, but not going into effect until 1994. The large jump in the income share between 1994 and 1995 is likely the result of income being shifted from 1994 into 1993. The 1995 data are probably the first year of data following the 1993 Act that exclude the effects of income shifting.

Changes in the income share reported by lower and moderate income taxpayers in the panel show small increases. The trends in Table 2 suggest the possibility of a significant behavioral response since the 1990 and 1993 Acts almost exclusively lowered the net-of-tax rates

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[11]In addition, the 1990 and 1993 Acts directly increased the tax rate on capital gains realizations for some taxpayers subject to the AMT. That is, the tax rate on capital gains realizations for taxpayers subject to the AMT was first increased from 21 percent to 24 percent by the 1990 Act and then to either 26 percent or 28 percent by the 1993 Act depending on a taxpayer's tentative alternative minimum taxable income.

on higher income taxpayers and this group had large declines in their real incomes both in absolute terms and relative to low and moderate income taxpayers.

The trend from the panel data does, at first glance, seem at odds with the rising income share of the high income in the cross-sectional data presented in Table 1. The tabulations from the cross-sectional data and panel data, however, could tell a story consistent with both a significant tax-induced behavioral response by high income taxpayers and the recent surge in individual income tax receipts, if the income gains of low and moderate income taxpayers more than offset the income reductions of the highest income taxpayers.

The trends in the first panel of Table 2, however, could also be the result of reversion to the mean where, rather than a long-run response to the tax change, high income taxpayers are merely reverting back to more typical levels of income. That is, incomes in the several years prior to the tax rate increases could simply include significant transitory income.

In contrast to the first panel in Table 2, the second panel classifies taxpayers according to their income in 1995 (deflated back to 1989 levels). The share of income reported by taxpayers with incomes over $200,000 reported a substantially greater share of income in 1995 (18.9 percent) than in 1989 (13.4 percent). Although this may not be surprising since classifying taxpayers based on their 1995 income includes taxpayers who “moved up” to the higher income classes, these differences point to the interpretive difficulty of drawing conclusions from tabulations that classify taxpayers based on either initial or ending incomes, which may include temporary shocks or transitory components of income that can distort longer term trends.

The third panel of Table 2 presents tabulations that classify taxpayers based on their average income over the entire period. These tabulations should mitigate the effects of transitory

changes and mean reversion in income. Some research has indicated that the transitory component in earnings dies off in roughly three years (Gottschalk, 1997). Also, inter-year shifting of income would have no impact on groupings based on average income because these effects net out. When the groupings are based on a taxpayer's average income the income share of the top class rises somewhat from 13.7 percent in 1989 to 15.8 percent in 1995.

The results from the panel data presented in Table 2 strongly suggest that groupings based on 1989 annual income likely suffer from reversion to the mean where taxpayers with temporarily high incomes in 1989 moved to more "normal" levels of income in 1995. Groupings based on 1989 income alone would overstate the income decline of the high income class. Since taxpayers in this income class are likely to have faced the higher rates under the 1990 and 1993 Acts, the estimated tax price elasticity would likely be biased upwards. Similarly, reversion to the mean would have the opposite effect if groupings were instead based on 1995 incomes. That is, income gains would be overstated and the elasticity biased downwards. The use of taxpayers' average income presents itself as a more plausible approach and serves as the basis for estimating the tax price elasticity in the empirical model presented below.

IV. Empirical Model

The empirical model can be viewed as a reduced form where income is assumed to be influenced by four factors,

$$y_{it} = \alpha_o + \alpha_1(1-\tau_{it}) + \beta X_i + \iota_i + \gamma_t + \varepsilon_{it} \qquad (1)$$

where y_{it} is the ith taxpayer's reported income at time t, α_o is a constant term, $(1-\tau_{it})$ is a

taxpayer's tax price or net-of-tax rate, X_i is a matrix of individual characteristics that do not change over time, but whose relationship to income may have changed, ι_i represents an individual effect (i.e., individual characteristics that do not change over time), and γ_t represents a time effect (i.e., factors that change over time, but do not vary across individuals). The tax rate is determined by,

$$\tau_{it} = f\left(Z_{it}, y_{it}\right) \tag{2}$$

where the tax function, f, is a nonlinear function of income and taxpayer characteristics, Z_i, including filing status, deductions, exemptions, and credits.

The individual effect is eliminated from the model through first differencing. Even after first-differencing, however, taxpayer characteristics that do not change over time, but whose relationship to income may have changed, remain in the model. A taxpayer's age, for example, can serve as a proxy for life cycle effects. Differences in regional and industry growth, or returns to human capital may also influence a taxpayer's potential for income growth, although the taxpayer did not move, and continued to work in the same industry or occupation.

Differences in the asset holdings of individuals may also explain differences in income growth, even if portfolios are unchanged. Taxpayers who receive a large fraction of their income from financial assets may have a different pattern of income growth than taxpayers who receive, for example, only wage income. Similarly, taxpayers who hold primarily business assets may have different potential for income growth than taxpayers who hold primarily financial assets, depending on differences in the rates of return to these assets. The matrix of taxpayer characteristics given by X_i is intended to control for as many of these nontax factors as the tax

return data allow. Separate year dummies are included to estimate the time effect.

Measuring the Permanent Response. Obtaining a consistent estimate of the tax-induced behavioral response is the primary concern of this paper. As shown in equation (2), however, a taxpayer's actual tax price is endogenous to the amount of income and deductions reported. As taxable income falls, a taxpayer's tax rate may also fall despite the rate increases under the 1990 and 1993 Acts. The endogeneity of the tax price can be addressed by constructing a synthetic tax price that is conditional on income at a particular point in time. Such a synthetic tax price will be correlated with the endogenous variable (i.e., a taxpayer's actual tax price), but uncorrelated with the error term because it only includes variation in the tax price due to the statutory changes in the tax code.

In addition to endogeneity, however, a taxpayer's actual tax rate will be composed of both a permanent tax component, τ_p, and a transitory tax component, μ_t, given by,

$$\tau_t = \tau_p + \mu_t \qquad (3)$$

Since this paper is interested primarily in taxpayers' permanent response to tax rate changes, an instrumental variables approach similar to Burman and Randolph (1994) and Randolph (1995) is used.[12] An appropriate instrument is one that is correlated with τ_t, but not μ_t. A taxpayer's tax rate calculated based on his permanent income only includes variation due to exogenous shifts in the tax rate schedule (and other statutory changes) and removes the influence of the transitory component of income on τ_t.

[12]It is unlikely that the estimated tax price elasticity is fully long-run because the effects of the tax rate changes on capital formation and other slowly changing factors are not likely to be fully realized even by 1995.

Permanent income is proxied by a taxpayer's seven year average income (i.e., 1989 through 1995). Next, this proxy for permanent income is used to calculate a taxpayer's tax rate in each year based on his average characteristics. This synthetic tax rate is used to construct the difference in the natural logarithm of a taxpayer's tax price, which is then used as an instrument to estimate fitted values of τ_t, which are used in place of a taxpayer's actual tax price in the first differenced version of equation 1.

The synthetic tax price used in this procedure has two important attributes. First, because it is based on a taxpayer's permanent income, it is based on a single value of a taxpayer's income. Therefore, year-to-year fluctuations in income will not influence this "synthetic" tax price and it will only capture exogenous changes in tax rates due to shifts in the rate schedule and other statutory tax changes. This attribute is similar to the use of initial income to group taxpayers in the difference of difference calculations of Feldstein (1995), and the instruments developed by Auten and Carroll (1997) and Moffitt and Wilhelm (1997), which rely on taxpayer characteristics at a single point in time, albeit in the initial period.[13]

Second, the tax price is based on a taxpayer's permanent income, rather than annual income. As suggested by Table 2, reversion to the mean is prevalent in the data used by this paper.[14] The use of a single year of income on which to calculate the synthetic tax price would

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[13]Other papers have also calculated synthetic tax rates to capture exogenous changes in tax rates and identify tax-induced behavioral responses. For example, see Eissa (1995), and Carroll et al (1996).

[14]Moffitt and Wilhelm (1997) discuss a somewhat different approach for controlling for reversion to the mean that conditions the change in income on income in the initial period. Moffitt and Wilhelm point out, however, that this alternate approach creates some difficulty because, depending on the specification, income in the initial period could enter the model twice, first through the synthetic tax rate and second through conditioning the income change on initial income. In addition, it is not clear how this approach controls for reversion to the mean associated with the level of ending income.

likely result in substantial bias in the estimated tax price elasticity. Observed changes in income may reflect changes in the transitory component of income that either have little to do with the tax changes or reflect year-to-year shifting of income and deductions that, although attributable to the tax change, are transitory in nature. A synthetic tax price based on a taxpayer's permanent income removes individual transitory effects because it is uncorrelated with transitory variations in individuals income, thereby allowing consistent estimation of the permanent response.[15] Similar to Burman and Randolph (1994), aggregate transitory effects are removed by including time dummies.

The Data. The panel data described above and used for the tabulations shown in Table 3 are used to estimate equation 1. Tax returns with incomes below $50,000 (1989$), however, are excluded from the panel used for estimation. This sample exclusion defines the set of taxpayers who are included in the control group (i.e., those taxpayers with no tax change) from which the tax price elasticity is identified. The judgment is that taxpayers with incomes below $50,000 are not a suitable control group for taxpayers facing the higher tax rates under the 1993 Act.[16] With 4,233 tax returns in the panel spanning seven years, 25,398 observations are used for estimation after first differencing. All results are weighted using the weighting procedure described above. The mean and standard deviation of the dependent and independent variables are presented in Table 3.

The dependent variable is gross income, defined as a taxpayer's total income (in 1995,

[15]While is would also be desirable to separately estimate the transitory response, another instrument that is correlated with a taxpayer's actual tax rate, but uncorrelated with their permanent tax rate would be needed.

[16]Other problems with including low income taxpayers are that many low income taxpayers drop out of the sample over time and the tax rates faced by these taxpayers were substantially changed because of changes to the earned income tax credit (EITC) in 1993. Excluding low income taxpayers also helps abstract from the behavioral effects of the EITC and temporary shocks to income due to unemployment.

Form 1040, line 22).[17] Although this income concept includes capital gains realizations, the results presented below are not sensitive to the exclusion of capital gains from income. The change in the natural logarithm of annual income is calculated after deflating income in each year to 1989 levels using the consumer price index (CPI). A taxpayer's taxable income, after adjusting for statutory changes in the tax base, is used as the dependent variable in an alternative specification also presented below.

The net-of-tax rate is defined as one minus a taxpayer's Federal marginal tax rate and is analogous to a taxpayer's "tax price."[18] The marginal tax rates incorporate both the features of the individual income tax and the effect of increases in the cap on wages subject to the tax for Health Insurance (Part A of Medicare) included in both the 1990 and 1993 Acts. Tax rates are calculated using detailed tax calculators designed to capture the major features of the individual income tax and changes to the wage cap for health insurance tax (Medicare Part A) occurring in both 1990 and 1993. Descriptive statistics for a taxpayers' actual tax price in 1989 and 1995 are shown in Table 3.

The ability to control for differences between taxpayers is important because a key assumption in studies that use shifts in the tax schedule to identify behavioral responses is that groups facing different changes in their relative taxation are suitable control groups. Failure to control for taxpayer characteristics that may explain differences in their income growth may result

[17]Unlike earlier tax reforms, the 1990 and 1993 Acts made relatively few changes to the tax base. Although the 1993 Act increased the fraction of Social Security benefits subject to tax for high income taxpayers, this change in the tax base has no effect on the results reported below because elderly taxpayers are excluded from the panel.

[18]The tax calculators were adapted for use with panel data from the U.S. Treasury Department's Individual Tax Simulation Model.

in spurious correlation between these omitted influences and tax rate changes, and bias the estimated tax price elasticity.[19] This assumption is perhaps more extreme in the case of the 1993 Act because, unlike the tax rate reductions of the 1980s, the 1993 Act only increased the tax rates of the highest income taxpayers.

Taxpayer wealth is likely to influence a taxpayer's ability to alter portfolios and labor arrangements in response to tax changes. Tax return data, however, provide no direct measure of a taxpayer's wealth. Taxpayers may also exhibit income changes that are completely unrelated to tax induced behavioral responses if they happen to hold assets that provide above average returns. For example, taxpayers could experience low income growth simply because they happen to hold short-term interest-bearing assets when interest rates fall or corporate equity when corporate earnings fall. Or, to the extent financial assets produce greater returns than labor, taxpayers with greater holdings of financial assets would tend to exhibit higher income growth. The sum of a taxpayer's dividend and interest income is used as a proxy for individual holdings of financial assets to control for a taxpayer's potential for income growth arising from these holdings.[20]

A dummy variable is included to indicate whether a taxpayer reports income from a sole proprietorship, partnership, or subchapter S corporation. This variable may reflect ownership of business assets, entrepreneurship skills, education and the propensity for risk-taking. Also, the income growth of taxpayers with holdings of business assets are likely to reflect the extent to

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[19]Relatively high (low) income growth may, for example, result simply because a taxpayer holds a large (small) amount of assets with high returns. In the case of taxable interest income, movements in interest rates would tend to have a greater impact on the income growth of taxpayers who hold a disproportionate share of short-term interest yielding assets prior to the tax change, than taxpayers who do not, holding portfolio allocations constant.

[20]Both capital gains and tax-exempt interest are excluded from this variable. The tax return data only contain a taxpayer's capital gains when realized, not accrued.

which returns to business investments generally were above or below average income growth.

Age and age squared are included to control for life cycle effects. The number of children (up to a maximum of 6) and a dummy variable indicating whether a taxpayer has any children away from home but still claimed as dependents are also included. Dependent children away from home are typically in college and may limit the ability of a taxpayer to respond to changes in tax rates because income is already being used to cover college expenses. Regional dummies are also included to capture the different opportunities for income growth that existed in different regions during this period.

This paper considers whether differences in earnings growth by industry may explain income growth. Categorical variables developed from the principal activity code on taxpayers' Schedule C's (sole proprietorship) forms, taxpayers' W-2 information returns, and data from the IRS's Business Master File are included to control for different earnings potential based on the principal business activity of employers.[21] As shown in Table 4, income growth varied widely during this period according to the employer's principal industry.

Including occupational dummy variables for the categories listed on Table 5 allows consideration of whether occupations with higher educational content or requirements also experience higher income growth, all else equal. As shown in Table 5, income growth of taxpayers varied considerably across occupation categories.[22] Returns to human capital may have

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[21]These data were developed by the Statistics of Income Division of the IRS from a number of different sources including the principal business activity code reported by sole proprietors on their Schedule C forms and firms' industry information obtained by matching employees W-2 information returns to their respective employers business tax return from the IRS's Business Master File.

[22]Taxpayer reported occupation descriptions were classified using the Standard Occupation Classification (SOC) system (see Clark, Reilly, and Sailer, 1989). The returns in the panel were classified by the Statistics of Income Division of the IRS using information from both a taxpayer's occupation

changed differently for individuals in certain occupations because of differences in relative labor productivity or differences in demand, perhaps due to technological changes or increasing international competitiveness. After excluding lower income taxpayers from the sample, CEOs and other senior executives, doctors and other health-related occupations, and managers and junior executives, experienced the highest income growth. Taxpayers with unclassifiable occupation codes and blue collar workers had the smallest increase in real incomes.

Income growth, however, could also vary across occupations because some occupations may offer greater flexibility to alter work effort or portfolios than others. For example, doctors, lawyers, and the self-employed have considerable flexibility to alter their work schedules and compensation arrangements in response to the tax rate changes. If the occupation variables control for this tax-related effect, inclusion of these variables could bias the estimated elasticity for the tax variable downwards (Feldstein, 1996).[23]

V. Estimation Results

Estimates for the determinants of income growth are reported in Table 6. Two income measures are used for the dependent variable: (1) gross income, and (2) adjusted taxable income. All equations are estimated using weighted least squares. The synthetic tax price based on a taxpayer's permanent income is used as an instrument in all the specifications presented. The

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description in 1993 and the industry classification of a taxpayer's employer obtained from W-2 Forms. SOC classifications were aggregated into occupational groups reflecting education and skill levels, and, in some cases, type of employer (government) and industry (doctors and other health related services).

[23]These variables also may control for transitory changes in income to the extent that, for example, the self-employed tend to have very volatile income and executives may tend to have very high income for relatively short periods.

"taxes only" specification (i.e., columns 1 and 3) is presented to illustrate the effect of including nontax factors (i.e., columns 2 and 4) on the estimated tax price elasticity.

The "taxes only" specification in columns (1) and (3), which only includes a constant term, the difference in the natural logarithm of the tax price (i.e., $1-\tau$), and the year dummies, is similar to earlier research that excludes non-tax factors from the model (for example, see Feldstein 1995a, Navratil 1994, and Lindsey 1987). The estimated tax price elasticity for this specification is 0.26 (s.e.=0.09) for the gross income equation and 0.31 (s.e.=0.11) for the taxable income equation. Both of these estimates are well below results reported elsewhere.[24] The coefficient for the 1990-91 year dummies are negative, perhaps reflecting the downturn in the business cycle. The 1992-93 year dummies are also negative, perhaps reflecting income shifting from 1993 into 1992.

In the fully specified model reported in columns (2) and (4), the coefficient for the proxy for financial wealth is positive, implying that income grew more slowly for those with greater holdings of interest and dividend yielding assets, all else equal, but statistically insignificant. The signs of the coefficients for age and age squared are jointly significant and imply that income growth declines with age. The coefficient for the entrepreneurship dummy is positive in both specifications, but not statistically different from zero.

The coefficients for the number of children and the dummy variable for college age children are positively related to income growth in both specifications, but not statistically different from zero. The positive sign on the dummy variable for college age children is

[24]In an earlier version of this paper, a two year panel including only tax returns for 1989 and 1995 was used. The tax price elasticities estimated using a specification comparable to the difference of differences calculations reported by Feldstein (1995) and the model used by Auten and Carroll (1998) were somewhat higher than the elasticities reported by these earlier studies.

inconsistent with the view that taxpayers with college age children are liquidity constrained. The regional and industry dummy variables are jointly significant indicating that a taxpayer's income growth is influenced by regional economic performance and industry.

Some of the coefficients for the occupation dummies are statistically different than zero and suggest that changes in returns to human capital were an important factor explaining income growth. Taxpayers in occupations with high educational content, particularly CEOs and other executives, and managers and junior executives, experienced the greatest income growth during this period (all else constant), in contrast to taxpayers in occupations with relatively less educational content (all else constant). The effects of occupation, however, must be interpreted with care. In addition to a taxpayer's human capital, occupation may also reflect taxpayers' flexibility for rearranging affairs in response to changes in tax rates.

The estimated tax price elasticity is 0.32 with a standard error of 0.10 for the gross income equation including the nontax factors. The estimated tax price elasticity rises to 0.38 (s.e=0.12) for the taxable income equation. The tax price elasticity for the taxable income equation is expected to be higher than in the gross income equation because changes in a taxpayer’s taxable income include behavioral responses associated with a taxpayer’s deductions or adjustments to income, while gross income would not.

The inclusion of the nontax factors increases the estimated tax price elasticity somewhat. Even though occupation is an important factor explaining income growth, including occupation in the model does not appear to affect the estimated tax price elasticity. In an alternative specification that excludes the occupational variables, the tax price elasticities comparable to those reported in columns (3) and (4) are 0.31 (s.e.=0.09) and 0.35 (s.e.=0.11).

Alternative Specifications. A number of assumptions were made above concerning the choice of the sample and model specification. Estimates using alternative sample exclusions and specifications are presented below and summarized in Table 7 to access the robustness of the results.

The sample excludes taxpayers with incomes below $50,000. This sample restriction defines the control group used to identify the tax price elasticity as primarily taxpayers with incomes above $50,000, but below the rate thresholds for their higher tax rates enacted by the 1990 and 1993 Acts; that is, the group facing no change in marginal tax rates.[25] This exclusion is tightened by excluding all taxpayers with incomes below $75,000, instead of $50,000, which reduces the sample size to 3,503. This change in the sample increases the estimated tax price elasticities somewhat (gross income: coef.=0.48 (s.e.=0.12); taxable income: coef.=0.56 (s.e.=0.14)).

In the sample used for Table 6, AMT taxpayers are excluded because they are, in effect, subject to a completely different, but parallel income tax with a different rate structure and tax base. Nevertheless, adding these taxpayers back to the sample increases the sample to 4,739 taxpayers, and the estimated elasticities fall slightly (gross income: 0.29 (s.e.=0.09); taxable income: 0.33 (s.e.=0.11), suggesting that the results are not very sensitive to this sample restriction.

Both the gross income and taxable income measures used for Table 6 include capital gains income. The 1990 and 1993 Acts, however, changed the relative taxation between interest and

[25]Intertemporal variation in tax rates and differences between the income changes of taxpayers in the 36 percent and 39.6 percent tax bracket should also help identify the tax price.

dividend income and capital gains income by increasing rates on ordinary income and either lowering (i.e., 1990 Act) or keeping the maximum rate on capital gains fixed (i.e., 1993 Act). Consequently, the change in relative taxation may have induced taxpayers to rearrange their portfolios to hold more assets that yield tax favored capital gains, rather than income taxed at regular rates. The effect of such portfolio reallocations on the estimated tax price elasticities is considered by excluding capital gains from both the gross income and taxable income measures. This change in the definition of the dependent variable has only a modest effect on the estimated tax price elasticities, lowering the gross income elasticity slightly to 0.26 (s.e.=0.11) and increasing the taxable income elasticity slightly to 0.40 (s.e.=0.16).

As mentioned above, the tax price incorporates the changes in the wage cap used for the Medicare (HI) Part A tax. These changes increase the marginal tax rate faced by employees by 1.45 percentage points from the employee share of the tax. Depending on the incidence of the employer share of this tax, however, the increase in the marginal tax rate could be as high as 2.9 percentage points. In an alternate specification, the tax price is first recalculated to incorporate both the employee and employer share of this tax. This modification lowers the estimated tax price elasticities somewhat (gross income: coef.=0.27 (s.e.=0.09); taxable income: coef.=0.31 (s.e.=0.11)). The lower elasticity obtained when including both portions of the HI tax is expected because a larger change in a taxpayer's tax price will be observed for a given income change. Instead, if the HI tax is entirely removed from the tax price, the estimated elasticities rise somewhat (gross income: coef.=0.33 (s.e.=0.10); taxable income: coef.=0.40 (s.e.=0.11)).

In summary, these results indicate that the estimated tax price elasticity is positive, but substantially smaller than reported by studies relying on the tax reductions of the 1980s for

identification of the tax price elasticity. This qualitative result does not change after making a number of alternative assumptions about the sample, the dependent variable, and the specification of the tax price.

Implications for Revenue. The tax price elasticities estimated above are used to simulate the behavioral response associated with the higher tax rates under the 1993 Act and its effect on revenues. The taxable income elasticity with respect to the net-of-tax rate, 0.38, is used because it reflects the various types of behavioral responses affecting both income and deductions and is therefore appropriate for analyzing the impact of the response on revenues. All of the simulations presented below are at 1993 incomes and use the U.S. Treasury's Individual Income Tax Model.

First, the static effect of the 36 percent and the 39.6 percent tax rates are simulated by comparing taxable income and tax liability before the 1993 Act to taxable income and tax liability after the 36 percent and 39.6 percent rates are imposed. As shown in Table 8, before the imposition of the two new tax rates, taxpayers reported taxable income of $2,453.0 billion and tax liability of $471.6 billion. Assuming no taxpayer behavior, the two new tax rates would have increased tax liability to $488.6 billion resulting in a static revenue gain of about $17.0 billion.

Second, the taxable income elasticity (0.38) is applied to the percentage change in taxpayers' net-of-tax rate to estimate the tax-induced change in taxable income (net of capital gains). The tax-induced behavioral response reduces taxable income by $17.4 billion to $2,435.6 billion and tax liability falls by $6.6 billion to $482.0. The net change in liability after the simulated tax-induced behavioral response is $10.4 billion implying a revenue offset relative to the static revenue gain of 39 percent.

This estimate of the revenue offset, however, assumes that the tax-induced behavioral

response reduces aggregate taxable income, rather than shifting income to activities that are still taxed, albeit at a lower rate. For example, although a reduction in labor supply by high income taxpayers would lower their taxable incomes, some economic activity could be shifted to taxpayers who, on average, face a lower tax rate. High income doctors might reduce the number of patient visits as they adjust their labor/leisure choice, but the patients, whose need for medical care remains unchanged, may seek medical care provided by doctors or other health care practitioners who, on average, face a lower marginal tax rate. Similarly, the change in the relative taxation of income earned by businesses organized in the corporate versus noncorporate form might cause a shift towards earning income by businesses in the corporate form. In both of these examples, the reduction in taxable income by taxpayers facing the higher tax rates is, at least partly, matched by a rise in the taxable income by other taxpayers or other taxable activities.[26] Indeed, when estimating the revenue effects of tax changes government economists typically assume that gross domestic product, as well as other macro-economic aggregates, are held constant. That is, feed-back effects are not incorporated.

Although determining whether the behavioral response takes the form of a reduction in aggregate income or reshuffling of economic activity between high and low tax activities is an issue beyond the scope of this paper, this is a key issue for linking the behavioral response to the revenue offset. To highlight the importance of this issue, the revenue offset is recalculated in the lower panel of Table 8 with the additional assumption that the $17.4 billion reduction in taxable income by taxpayers facing the higher tax rates shown in the top panel is shifted to other activities

[26]Some "shifted" income could be taxed at a zero rate. For example, taxpayers subject to the higher tax rates could also rearrange their portfolios to hold more tax-exempt bonds, which are subject to a zero tax rate. In this case, reshuffling results in a commensurate increase in a non-taxed activity, rather than a reduction in economic activity.

or taxpayers, and taxed, on average, at a 25 percent rate. With this additional assumption the offset to the static revenue gain falls from 39 percent to 13 percent. The choice of the appropriate tax rate depends to what extent the behavioral response takes the form of reshuffling from high to low tax activities or a reduction in income.

VI. Conclusion

An important question in the public finance literature and among policy makers is how taxpayers respond to changes in tax rates. The answer to this question would help policy makers evaluate the apparent tradeoff between progressive tax rates and efficiency. This paper estimates the elasticity of a taxpayer's gross income and taxable income with respect to changes in his net-of tax rate or tax price. Rather than focusing on particular types of behavior, this elasticity provides an overall measure of responsiveness of taxpayers to tax rate changes.

This paper uses a panel of taxpayers spanning the tax increases enacted as part of the 1990 and 1993 Acts to consider to what extent taxpayers change their incomes in response to changes in tax rates. Focusing on a period of rising tax rates is important because it avoids the criticism of earlier research that observed changes in taxpayer incomes are merely the result of long-term trends of increasing income inequality that have little to do with changes in tax rates. This paper finds evidence of tax-induced behavioral responses with a gross income tax price elasticity of 0.3 and the taxable income tax price elasticity of nearly 0.4. These tax price elasticities suggest a smaller response than earlier studies of the tax rate reductions in the 1980s, but a response that is positive and significantly different from zero. This result suggests that the tax rate increases in the 1990 and 1993 Tax Acts resulted in lower reported incomes of taxpayers facing the higher rates.

Simulations of the behavioral response indicate that the higher individual income tax rates

under the 1993 Act may have reduced the static revenue gain by as much as 39 percent or as little as 13 percent depending on whether the behavioral response reduced output or reflected a reshuffling from high-tax to low-tax activities. Additional research that isolates the type of taxpayer behavior associated with the 1993 Act would be helpful for determining the appropriate revenue offset.

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Table 1

Distribution of Constant Law Income From Cross-Sections of Income Tax Returns

Constant Law Income 1/ (in thousands of 1989 dollars)	1989	1990	1991	1992	1993	1994	1995
Percent Distribution							
Under 0	-1.5%	-1.6%	-1.7%	-1.5%	-1.5%	-1.5%	-1.4%
0-10	4.7%	5.0%	5.2%	5.1%	5.2%	5.1%	5.1%
10-20	11.8%	11.8%	12.3%	12.0%	12.2%	12.4%	12.1%
20-30	13.0%	13.6%	14.0%	13.6%	13.6%	13.5%	13.2%
30-50	24.8%	24.9%	25.0%	24.4%	24.2%	24.0%	23.2%
50-75	17.9%	17.8%	17.6%	17.4%	17.4%	17.3%	16.8%
75-100	7.7%	7.4%	7.5%	7.3%	7.5%	7.3%	7.5%
100-200	8.6%	8.5%	8.5%	8.6%	8.9%	9.1%	9.5%
200-1,000	8.2%	8.1%	7.8%	8.3%	8.1%	8.3%	8.9%
Over 1,000	4.8%	4.6%	3.6%	4.7%	4.3%	4.4%	5.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Over 200	13.0%	12.6%	11.4%	13.1%	12.5%	12.7%	14.0%
Over 200 (Adjusted) 2/	13.0%	12.6%	11.4%	12.5%	12.6%	13.1%	14.0%
Average Incomes			(in 1989 dollars)				
Under 0	-64,335	-59,226	-60,410	-53,932	-51,995	-56,229	-54,333
0-10	4,825	4,892	4,909	4,976	4,949	4,962	4,967
10-20	14,694	14,714	14,682	14,690	14,650	14,646	14,690
20-30	24,669	24,687	24,674	24,692	24,648	24,610	24,677
30-50	38,764	38,726	38,666	38,700	38,634	38,732	38,772
50-75	59,926	59,887	59,841	60,083	59,884	59,904	60,073
75-100	85,339	85,238	85,298	85,499	85,311	85,067	85,341
100-200	132,175	132,193	131,150	131,926	132,586	132,891	132,227
200-1,000	354,040	358,662	339,633	355,304	350,278	347,455	349,803
Over 1,000	2,624,133	2,550,992	2,400,091	2,626,181	2,542,332	2,576,744	2,570,266
All Taxpayers	29,043	28,481	27,602	28,372	28,052	28,222	28,772
Over 200	521,781	520,437	467,248	516,912	501,170	496,429	509,257
Over 200 (Adjusted) 2/	521,781	520,437	467,248	497,526	506,677	510,033	509,257

Source: Tabulations from SOI Individual Tax Files.

1/ Taxpayers are classified according to their "constant law income." Constant law income equals a taxpayer's total income in each year,

minus:	Social Security benefits moving expenses unreimbursed employee business expenses alimony paid	plus:	tax-exempt interest income untaxed pension benefits disallowed passive losses foreign income exclusion depreciation in excess of straight-line depreciation

2/ Amounts are "adjusted" to reflect shifting of $15.8 billion in wages and bonus income from 1993 into 1992 and $11.4 billion in wages and bonus income from 1994 into 1993.

Table 2

Distribution of Income From Panel of Taxpayers
Taxpayers Classified Based on Initial Income, Ending Income and Average Income

Gross Income ($1,000s)	1989	1990	1991	1992	1993	1994	1995
Taxpayers Classified Based on Their 1989 Incomes:							
Under 0	-0.8%	0.1%	-0.2%	-0.1%	0.0%	0.1%	0.2%
0-10	0.3%	0.6%	0.6%	0.6%	0.6%	0.7%	0.7%
10-20	2.0%	2.4%	2.5%	2.6%	2.7%	2.8%	2.8%
20-30	5.7%	6.0%	6.2%	6.0%	6.3%	6.3%	6.3%
30-50	25.3%	25.4%	25.7%	25.6%	25.6%	26.3%	25.5%
50-75	27.5%	26.9%	27.4%	26.8%	26.8%	27.1%	26.4%
75-100	13.0%	13.1%	12.9%	12.7%	12.6%	12.7%	12.7%
100-200	12.4%	12.0%	12.3%	12.6%	12.8%	12.4%	12.7%
200-1,000	10.4%	10.1%	9.9%	10.1%	9.7%	9.1%	9.6%
Over 1,000	4.1%	3.4%	2.6%	3.1%	2.7%	2.5%	3.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Taxpayers Classified Based on Their 1995 Incomes (in 1989$):							
Under 0	0.4%	0.2%	0.0%	-0.0%	-0.1%	-0.4%	-0.8%
0-10	0.9%	0.9%	0.8%	0.7%	0.7%	0.5%	0.3%
10-20	3.0%	2.8%	2.6%	2.5%	3.0%	2.1%	1.8%
20-30	6.5%	6.3%	6.1%	6.0%	5.7%	5.5%	5.0%
30-50	24.0%	24.2%	23.7%	23.0%	22.9%	22.9%	21.7%
50-75	26.0%	25.7%	26.1%	25.8%	25.8%	26.1%	25.3%
75-100	11.6%	11.7%	11.7%	11.6%	11.9%	12.1%	12.0%
100-200	14.2%	14.1%	14.6%	14.6%	14.6%	15.0%	15.8%
200-1,000	10.0%	10.8%	11.1%	11.9%	11.7%	12.4%	13.3%
Over 1,000	3.4%	3.3%	3.3%	4.0%	3.9%	3.9%	5.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Taxpayers Classified Based on Their Average Income (in 1989$) 1/:							
Under 0	-0.4%	-0.4%	-0.6%	-0.7%	-0.6%	-0.7%	-0.5%
0-10	0.2%	0.2%	0.2%	0.2%	0.1%	0.2%	0.2%
10-20	2.0%	1.9%	1.8%	1.8%	1.7%	1.8%	1.8%
20-30	6.2%	6.0%	5.8%	5.8%	5.8%	5.8%	5.6%
30-50	25.4%	25.0%	25.0%	24.4%	24.4%	24.7%	23.9%
50-75	27.9%	27.6%	28.0%	27.7%	27.4%	27.7%	27.1%
75-100	11.7%	11.7%	11.8%	11.8%	11.9%	11.8%	11.6%
100-200	13.3%	13.4%	13.7%	13.5%	13.7%	14.4%	14.6%
200-1,000	10.1%	11.0%	10.8%	11.4%	10.8%	10.8%	11.3%
Over 1,000	3.6%	3.7%	3.4%	4.1%	4.8%	3.5%	4.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Tabulations by author.

Note: Income defined as taxpayer's total income plus tax-exempt interest income. Sample of taxpayers includes joint filers between the ages of 25 and 55 in 1989 without AMT liability. Weighted using maximal sample weight from cross-sectional files.

1/ Average of taxpayer's income from 1989 through 1995.

TABLE 3

SAMPLE MEANS AND STANDARD DEVIATIONS OF VARIABLES (n=4,233)
Unless Indicated Otherwise, Values are for 1989

Variables	Mean	Standard Deviation
Δ Log of Constant Law Gross Income, 1989-1990	0.027	5.351
Δ Log of Constant Law Taxable Income, 1989-1990	0.0252	6.345
$1-\tau_{89}$	0.697	0.511
$1-\tau_{95}$	0.650	0.102
Log of Income from Financial Assets	7.519	36.065
Entrepreneur Dummy	0.546	10.008
Age	42.9	136.7
Age Squared	1,890	11554
Number of Children	1.43	22.52
College Age Children	0.032	4.17
Regional Dummy Variables:		
Northeast	0.056	4.624
Mid-Atlantic	0.187	7.845
West-North Central	0.075	5.282
South Atlantic	0.157	7.303
East South Central	0.048	4.305
West South Central	0.094	5.868
Mountain	0.048	4.303
Pacific	0.153	7.229
Industry Dummy Variables:		
Agriculture, Mining and Construction	0.035	3.673
Manufacturing	0.184	7.795
Transportation and Public Utilities	0.055	4.579
Wholesale Trade	0.046	4.211
Retail Trade	0.037	3.771
Finance, Insurance and Real Estate	0.077	5.358
Services	0.253	8.740
Public Administration	0.095	5.894

TABLE 4

Income Growth by Industry Category, 1989-1995

Occupation Category	No Income-Based Sample Exclusion		Exclude Taxpayers with Incomes Below $50,000	
	Sample	Real Income Growth 1/	Sample	Real Income Growth 1/
Agriculture, Mining and Construction	812	3%	186	0%
Manufacturing	1,614	12%	593	37%
Transportation and Public Utilities	514	8%	107	22%
Wholesale Trade	574	18%	274	35%
Retail Trade	788	7%	223	35%
Finance, Insurance and Real Estate	779	8%	352	19%
Services	2,873	13%	1,555	21%
Public Administration	750	7%	102	9%
Industry Information Not Available or NEC	2,455	6%	841	15%
All Industries	11,159	9%	4,233	22%

1/ Growth rates are calculated from weighted data.

TABLE 3 (Cont.)

Variables	Mean	Standard Deviation
Occupation Dummy Variables, 1993:		
CEOs & Other Senior Executives	0.117	6.468
Managers & Junior Executives	0.246	8.652
Investors	0.001	0.571
Lawyers	0.058	4.682
Artists, Athletes, & Journalists	0.012	2.145
Doctors & Other Health-Related Occupations	0.120	6.533
Scientists, Engineers, & Computer-Related Occupations	0.120	6.525
Other Professionals	0.029	3.348
Sales-Related Occupations	0.105	6.163
Clerical and Household Services Occupations	0.035	3.688
Production Workers	0.066	4.989

τ= Federal marginal tax rate. All values are weighted.

TABLE 5

Income Growth by Occupation Category, 1989-1995

Occupation Category	No Income-Based Sample Exclusion		Exclude Taxpayers with Incomes Below $50,000	
	Sample	Real Income Growth 1/	Sample	Real Income Growth 1/
CEOs & Other Senior Executives	1,627	21%	1,194	40%
Managers & Junior Executives	1,738	15%	721	27%
Investors	70	6%	41	16%
Lawyers	466	13%	338	18%
Artists, Athletes, & Journalists	207	13%	93	39%
Doctors & Other Health-Related Occupations	1,006	21%	842	12%
Scientists,Engineers,& Computer Occupations	747	12%	217	17%
Other Professionals	261	9%	46	18%
Sales-Related Occupations	1,252	7%	380	17%
Clerical and Household Services Occupations	601	3%	33	3%
Production Workers	1,768	2%	118	5%
Occupation Information Not Available or NEC	1,416	5%	210	15%
All Occupations	11,159	10%	4,233	22%

1/ Growth rates are calculated from weighted data.

TABLE 6

REGRESSION RESULTS

Variables	Gross Income		Adjusted Taxable Income	
	Taxes Only	**Full Model**	**Taxes Only**	**Full Model**
Intercept	0.027* (0.004)	0.239* (0.059)	0.025* (0.005)	0.186* (0.070)
Δ log of (1-τ)	0.26* (0.09)	0.32* (0.10)	0.31* (0.11)	0.38* (0.12)
Year Dummies:				
1990-91	-0.012* (0.006)	-0.011** (0.006)	-0.012** (0.007)	-0.011 (0.007)
1991-92	0.019* (0.006)	0.019* (0.006)	0.033* (0.007)	0.033* (0.007)
1992-93	-0.027* (0.006)	-0.025* (0.006)	-0.019* (0.007)	-0.017* (0.008)
1993-94	-0.0004 (0.0057)	0.0003 (0.057)	0.014* (0.007)	0.015* (0.008)
1994-95	0.0188* (0.0056)	0.019* (0.006)	0.029* (0.007)	0.029* (0.007)
Non-Tax Factors:				
Log of Income from Financial Assets		0.0008 (0.001)		0.0002 (0.0013)
Age		-0.0089* (0.0028)		-0.0063** (0.0034)
Age Squared		0.00008* (0.00003)		0.00005 (0.00004)
Entrepreneur Dummy		0.0033 (0.0038)		0.0021 (0.0045)
Number of Children		0.0021 (0.0017)		0.0029 (0.0020)
College Age Children		0.0017 (0.0103)		0.0003 (0.0124)
Regional Dummy Variables:				
Northeast		-0.0083 (0.0080)		-0.0096 (0.0096)
Mid-Atlantic		-0.0040 (0.0055)		-0.0047 (0.0066)
West-North Central		-0.0031 (0.0071)		-0.0077 (0.0086)
South Atlantic		-0.0027 (0.0057)		-0.0030 (0.0069)
East South Central		-0.0034 (0.0084)		-0.0038 (0.0101)
West South Central		-0.0069 (0.0066)		-0.0075 (0.0079)
Mountain		-0.0123 (0.0084)		-0.0163 (0.0101)
Pacific		0.0015 (0.0057)		0.0013 (0.0068)

TABLE 6 (Cont.)

Variables	Gross Income		Adjusted Taxable Income	
	Taxes Only	**Full Model**	**Taxes Only**	**Full Model**
Industry Dummy Variables:				
Agriculture, Mining and Construction		-0.021* (0.010)		-0.020** (0.012)
Manufacturing		0.010* (0.005)		0.012* (0.006)
Transportation and Public Utilities		-0.007 (0.008)		-0.005 (0.009)
Wholesale Trade		0.003 (0.009)		0.003 (0.011)
Retail Trade		0.012 (0.009)		0.009 (0.011)
Finance, Insurance and Real Estate		-0.005 (0.007)		-0.005 (0.008)
Services		0.005 (0.005)		0.003 (0.006)
Public Administration		-0.004 (0.007)		-0.006 (0.008)
Occupation Dummy Variables:				
CEOs & Other Senior Executives		0.0197* (0.0074)		0.0244* (0.0089)
Managers & Junior Executives		0.0123* (0.0063)		0.0145** (0.0076)
Investors		-0.0075 (0.0574)		-0.0266 (0.0690)
Lawyers		0.0072 (0.0089)		0.0092 (0.0106)
Artists, Athletes & Journalists		0.0078 (0.0162)		0.0020* (0.0195)
Doctors & Health-Related Occupations		0.0043 (0.0079)		0.0078* (0.0095)
Scientists,Engineers,& Computer Occupations		0.0042 (0.0072)		0.0014 (0.0086)
Other Professionals		0.0122 (0.0095)		0.0129 (0.0138)
Sales-Related Occupations		0.0095 (0.0078)		0.0117 (0.0094)
Clerical and Household Services Occupations		-0.0046 (0.0104)		-0.0124 (0.0125)
Production Workers		-0.0022 (0.0084)		-0.0024 (0.0101)

Note 1: Instrumental variables is used with generalized least squares. Difference in natural logarithm of synthetic tax price based on taxpayers' permanent income used as instrumental variable in all specifications. Taxable income adjusted to reflect law in 1989.

Note 2: Standard errors appear in parenthesis. * indicates variable is significant at the 95 percent level of confidence. ** indicates variable is significant at the 90 percent level of confidence. τ= Federal marginal tax rate. Observations=(4,233*6)=25,398.

TABLE 7

Estimated Tax Price Elasticity Under Alternative Sample Exclusions and Specifications

Specification	Sample Size	Gross Income		Adjusted Taxable Income	
		Taxes Only	Full Model	Taxes Only	Full Model
Exclude taxpayers with incomes below $75,000	3,503	0.38* (0.11)	0.48* (0.12)	0.48* (0.13)	0.56* (0.14)
Include taxpayers on the alternative minimum tax	4,739	0.24* (0.09)	0.29* (0.09)	0.29* (0.11)	0.33* (0.11)
Exclude capital gains from income	4,233	0.21* (0.11)	0.26* (0.11)	0.37* (0.15)	0.40* (0.16)
Include both employee and employer portions of HI tax	4,233	0.21* (0.08)	0.27* (0.09)	0.25* (0.10)	0.31* (0.11)
Exclude HI tax from tax price	4,233	0.27* (0.09)	0.33* (0.10)	0.33* (0.11)	0.40* (0.11)

Note 1: Instrumental variables is used with generalized least squares. Difference in natural logarithm of synthetic tax price based on taxpayers' permanent income used as instrument in all specifications. Note 2: Standard errors appear in parenthesis. * indicates significant at the 95 percent level of confidence. Taxable income is adjusted to reflect 1989 law.

Table 8

Simulation of the Effect on Revenues of the Individual Income Tax Rate Changes in the 1993 Tax Act

	Pre-1993 Tax Act	Post-1993 Tax Act (Static)	Static Change	Post-1993 Tax Act (Dynamic)	Behavior	Net Effect	Revenue Offset
				($ in billions)			
Behavioral Response (With No Income Shifting): 1/							
Taxable Income	2,453.0	2,453.0	0.0	2,435.6	-17.4	-17.4	
Tax Liability	471.6	488.6	17.0	482.0	-6.6	10.4	-39%
Behavioral Response (With Income Shifting): 2/							
Taxable Income	2,453.0	2,453.0	0.0	2,453.0	0.0	0.0	
Tax Liability	471.6	488.6	17.0	486.4	-2.3	14.8	-13%

Note: Simulation includes the effects of the 36 percent and 39.6 percent tax rates enacted as part of the 1993 Tax Act. The effects of the repeal of the wage cap on Health Insurance (Medicare Part A) taxes are not included. All estimates are at 1993 incomes.

1/ Assumes that the behavioral response reduces the taxable incomes of taxpayers facing the higher rates and the "lost" income is not shifted to other taxable activities.

2/ Assumes that the reduction in taxable income for those taxpayers facing the higher tax rates is "shifted" to other taxable activities or taxpayers.