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REPORTED INCOMES AND MARGINAL TAX RATES, 1960–2000: EVIDENCE AND POLICY IMPLICATIONS

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EXECUTIVE SUMMARY

This paper uses income tax return data from 1960 to 2000 to analyze the link between reported incomes and marginal tax rates. Only the top 1 percent of income earners show evidence of behavioral responses to taxation. The data display striking heterogeneity in the size of responses to tax changes over time, with no response either short-term or long-term for the very large Kennedy top income tax cuts in the early 1960s, and striking evidence of responses, at least in the short term, to the tax changes since the 1980s. The 1980s tax cuts generated a surge in business income reported by high-income individual taxpayers, due to a shift away from the corporate sector, and the disappearance of business losses for tax avoidance. The Tax Reform Act of 1986 and the recent 1993 tax increase generated large short-term responses of wages and salaries reported by top income earners most likely because of retiming in compensation to take advantage of the tax changes. It is unlikely, however, that the extraordinary trend upward of the shares of total wages accruing to top wage income earners, which started in the 1970s and accelerated in the 1980s and especially the late 1990s, can be explained solely by the evolution of marginal tax rates.

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1. INTRODUCTION

Over the last 40 years, the U.S. federal income tax system has undergone large changes. Perhaps the most striking change has been the dramatic decrease in top marginal income tax rates. From 1950 to the early 1960s, the statutory top marginal income tax rate was 91 percent. This rate was reduced to 70 percent by the Kennedy tax cuts in the mid-1960s. During the Reagan administrations of the 1980s, the top income tax rate was further reduced to 50 percent in 1982 by the Economic and Recovery Tax Act (ERTA) of 1981, and was reduced again to 28 percent in 1988 by the Tax Reform Act (TRA) of 1986. The top income tax rate was then increased to 31 percent in 1991 and further to 39.6 percent in 1993 by the Omnibus Budget Reconciliation Act (OBRA) of 1993. The top rate has been reduced to 35 percent in 2003 by the 2001 tax reform. Only about 500 taxpayers were subject to the top marginal tax rate of 91 percent in the early 1960s, but by 2000, more than half a million taxpayers were subject to the top rate.[1] Thus, the continuous and drastic progressivity of the federal income tax system up to the very highest income taxpayers has been replaced by a much flatter tax structure, where an upper-middle-class family can face the same marginal tax rate as the highest-income earners in the United States.

In addition to the redistributive effects, the dramatic reductions in top income tax rates might have generated large behavioral responses: the net-of-tax value of an additional dollar of pretax income (excluding state and local taxes) for those in the highest income bracket has experienced enormous variations over the period, from less than $0.10 in the early 1960s to more than $0.70 by the late 1980s and around $0.60 by 2000. It is plausible to think that such variations might have had substantial effects on the economic activity of high-income earners, such as labor supply decisions, career choices, and savings decisions, as well as on the form of compensation (salary versus untaxed fringe benefits, for example). Indeed, the intellectual weight behind the dramatic reduction in marginal income tax rates in the 1980s was the logic of supply-side economics, which argued that lower tax rates would generate important increases in economic activity and perhaps even tax revenues. As documented by Feenberg and Poterba (1993, 2000) and Piketty and Saez (2003), there has indeed been an extraordinary increase in the share of total income accruing to upper-income groups in the income distribution over the last 25 years. For example, the income share of the top 1 percent of taxpayers

[1] The statistics on the number of taxpayers in each tax bracket have been reported regularly since 1961 in the Internal Revenue Service (IRS) annual publication *Statistics of Income*.

(excluding capital gains from the analysis) has surged from less than 8 percent in the early 1970s to almost 17 percent in 2000 (Piketty and Saez, 2003). Feenberg and Poterba (1993) pointed out that the timing of the increase in top income shares, and most notably the surge in top income from 1986 to 1988 around TRA of 1986, appears to be closely related to the cuts in top income tax rates. Slemrod and Bakija (2001) and Piketty and Saez (2003) note, however, that the surge in top incomes accelerated in the late 1990s, although top income tax rates increased substantially in 1993.

The goal of this paper is to understand the effects of marginal income tax rates on reported incomes by analyzing the shares and composition of incomes accruing to various groups in the top tail of the income distribution, and the marginal income tax rates faced by those groups. The analysis will focus on the 1960–2000 period because it spans all the important tax changes since World War II.[2] This same period allows me to use the large and stratified public-use tax return microfiles released by the IRS since 1960, as well as the TAXSIM tax calculator created and maintained by the National Bureau of Economic Research (NBER) to estimate marginal and average tax rates.[3]

Many researchers have tried to estimate the effects of taxes on decisions such as those involving the labor supply, savings, and retirement. Over the past decade, researchers have pointed out that these standard behavioral responses are only components of what drives reported incomes; other responses (such as the form of compensation, tax-deductible activities, unmeasured effort, and compliance) also ultimately determine reported incomes, and these responses may be more elastic with respect to taxation. Feldstein (1999) shows that, under certain conditions, the overall elasticity of taxable income with respect to the net-of-tax rate (1 minus the marginal tax rate) is relevant for assessing the implications of tax changes for revenue raising and welfare. The influential studies of Lindsey (1987) and Feldstein (1995), which examined the 1980s tax cuts, estimated very large elasticities, in excess of 1. This striking conclusion has generated a substantial body of work on this central elasticity parameter and generated a wide range of estimated elasticities, ranging from Feldstein's (1995) and Lindsey's (1987) separate estimates at the high end to close to zero at the low end, depending on the estimation methodology and the tax reforms considered.[4]

[2] There are few studies on behavioral responses to taxation in the United States in the prewar era. Goolsbee (1999) provides a simple analysis of the most important episodes.

[3] See Feenberg and Coutts (1993) for a description of the TAXSIM calculator.

[4] See Gruber and Saez (2002) for a survey.

It is important to note that, in contrast to most previous studies, my analysis focuses on reported incomes before deductions, such as adjustments to gross income, personal exemptions, and standard and itemized deductions. Therefore, my income concept is market income rather than taxable income. Because taxable income is a smaller base than gross income, and because some components of deductions such as charitable giving or mortgage interest deductions are also responsive to marginal tax rates, the elasticities of taxable income are likely to be larger than the elasticities of reported incomes that I analyze here.[5]

My analysis shows that only the reported incomes of taxpayers within the top 1 percent of the income distribution appear to be responsive to changes in tax rates over the 1960–2000 period. Even upper-middle-income taxpayers (within the top decile but below the top 1 percent), who experienced substantial changes in marginal tax rates, show no evidence of responses to taxation, either in the short-run or the long-run. Attributing all the gains of the top 1 percent relative to the average to the changes in tax rates produces large elasticities of income with respect to net-of-tax rates, in excess of 1. However, allowing for simple secular and non-tax-related time trends in the top income share reduces the elasticity drastically (to about 0.5). Top income shares within the top 1 percent show striking evidence of large and immediate responses to the tax cuts of the 1980s, and the size of those responses is largest for the topmost income groups. In contrast, top incomes display no evidence of short- or long-term response to the extremely large changes in the net-of-tax rates following the Kennedy tax cuts in the early 1960s.

Data on the composition of income show that part of the response to the 1980s tax cuts has been due to a sudden and permanent shift of corporate income toward the individual income sector using partnerships and Subchapter S corporations, legal entities taxed only at the individual level. However, most of the surge in top incomes since the 1970s has been due to a smooth and extraordinary increase in the wages and salary component (which includes stock-option exercises). This wage income surge started slowly in the early 1970s and has accelerated over the period, and especially during the last decade, and does not seem to be closely related to the timing of the tax cuts. There is evidence of short-term responses of the wage income component around TRA 1986 and OBRA 1993: top wage

[5] Gruber and Saez (2002) indeed find larger elasticities for taxable income than for adjusted gross income. Here, I focus on gross income because the nature and size of deductions has changed considerably over time so that, in contrast to gross income, it is not possible to construct consistent time series of taxable income. A large part of the literature has analyzed the response of the main components of itemized deductions such as charitable contributions and interest deductions.

income shares spike just after the tax reduction of 1986 and just before the tax increase of 1993, suggesting that highly paid employees were able to retime their compensation to take advantage of the tax changes. It is difficult, however, to tell apart a long-term effect of tax cuts from a non-tax-related secular widening of the disparity of earnings.

The paper is organized as follows. Section 2 describes the key identification issues in estimating behavioral elasticities of income with respect to marginal tax rates and shows how such elasticity estimates can be used for tax policy analysis. Section 3 presents the results on income shares and marginal tax rates, as well as the evolution of the composition of top incomes. Section 4 concludes by contrasting the U.S. experience with evidence from other countries.

2. CONCEPTUAL FRAMEWORK AND METHODOLOGY

2.1 *Estimating Elasticities*

The economic model underlying the estimation of behavioral responses to income taxation is a simple extension of the static labor supply model. Individuals maximize a utility function $u(c, z)$ increasing in after-tax income c (available, for example, for consumption) and decreasing in before-tax income z (earning income is costly, for example). The budget constraint takes the form $c = (1 - \tau) z + R$, where τ is the marginal tax rate and R is virtual income. Such maximization generates an individual "reported income" function of $z(1 - \tau, R)$ which depends on the net-of-tax rate $1 - \tau$ and virtual income R.[6] Each individual has a particular income supply function reflecting his or her skills, taste for labor, etc. Income effects are ignored, so the income function z is independent of R and depends only on the net-of-tax rate.[7] The key point is that, in contrast to the standard labor supply model, changes in hours of work isn't the only factor that can affect earnings z; intensity of work on the job, career choices, form of compensation, tax-deductible activities, etc., can also affect earnings. The analysis below will show that it is indeed the full response of reported incomes that is relevant for tax policy (a point made by Feldstein, 1999).

The literature on behavioral responses to taxation has attempted to use tax reforms to identify the elasticity of reported incomes with respect to

[6] This reported income supply function remains valid in the case of nonlinear tax schedules; $c = (1 - \tau) z + R$ then represents the linearized budget constraint at the utility maximizing point.

[7] Labor supply studies in general estimate modest income effects. See Blundell and Macurdy (1999) for a survey. Gruber and Saez (2002) try to estimate both income and substitution effects in the case of reported incomes and find small and insignificant income effects.

the net-of-tax rate defined as $e = [(1-\tau)/z]\,\partial z/\partial(1-\tau)$ in the notation used above. To isolate the effects of the net-of-tax rate, one compares observed reported incomes after the tax rate change to the incomes that would have been reported had the tax change not taken place. Obviously, the latter are not observed and must be estimated. The simplest method consists in using as proxy reported incomes before the reform, and hence in relating changes in reported incomes before and after the reform to changes in tax rates.

Lindsey (1987) and Feldstein (1995) applied this methodology to the ERTA 1981 and TRA 1986 tax changes and found that top income groups, which experienced the largest marginal tax cuts, also experienced the largest gains in reported incomes. As a result, Lindsey (1987) and Feldstein (1995) obtain extremely large elasticities, between 1 and 3, with preferred estimates around 1.5. Several important issues surround those estimates.

First, as pointed out by Slemrod (1996, 1998) and Goolsbee (2000a), these elasticities are upward biased if, for non-tax-related reasons, top incomes increased more rapidly than average incomes during that period. A large body of work has suggested that nontax factors, such as skill-biased technical progress, the development of international trade, or the decline of unions, might have led to a substantial increase in earnings disparity in the 1980s [see Katz and Autor (1999) for a survey]. To overcome this issue, it would be preferable to compare taxpayers with similar incomes rather than comparing high incomes to middle incomes. In the case of income taxation, this approach is difficult for two reasons. First, for most reforms, taxpayers with similar incomes face very similar tax changes.[8] Second, although the discontinuity in marginal tax rates due to the progressive bracket structure creates sharp changes in marginal incentives for taxpayers with very similar incomes, this situation cannot be satisfactorily exploited to estimate elasticities because it appears that taxpayers either control their incomes imperfectly or are not well aware of the details of the tax code and their precise location on the tax schedule.[9,10] Therefore, it is conceivable that only large or salient tax changes are likely to generate behavioral responses, which raises some interesting and

[8] In contrast, for redistributive programs (such as the Earned Income Tax Credit, which is targeted to taxpayers with children) taxpayers with no children but similar income can be used as a plausibly better control group for identifying the effects of the program (see, for example, Eissa and Liebman, 1996).

[9] In an earlier study (Saez, 2003), I tried to exploit this feature and the bracket creep from 1979 to 1981 to identify behavioral responses.

[10] In an earlier study (Saez, 2002), I documented in detail the fact that bunching, as predicted by theory, does not occur at the kink points of the tax schedule.

complicated issues about the estimation of behavioral responses and the design of tax policy [see Liebman and Zeckhauser (2003) for an analysis along these lines].

Second, comparing years just before and just after the reform might reveal a short-term elasticity, which can be quite different from the long-term elasticity, the relevant parameter for tax policy. Slemrod (1995) discusses this point, and Goolsbee (2000b) shows convincingly that executives exercised numerous stock options in 1992 to avoid the higher tax rate starting in 1993, which created a large short-term elasticity of reported income around OBRA 1993; the longer-term elasticity was much smaller and possibly equal to zero.[11] Looking at times series spanning several years before and after the reform, as in Feenberg and Poterba (1993), can be helpful for making progress on these two issues. Slemrod (1996) proposes an aggregate time-series regression framework, for the period 1954 to 1990, to try and disentangle tax and nontax influences on the share and composition of income accruing to the top 0.5 percent taxpayers.

Third, the Lindsey (1987) and Feldstein (1995) studies assume implicitly that reported income elasticities are the same for all income groups and, as we will see, the data strongly suggest that those taxpayers with very high incomes are much more responsive to changes in taxation than taxpayers in the middle or upper-middle class. More precisely, instead of adopting the simple difference method just described, they compare changes in the incomes of the very high incomes (experiencing the largest tax rate changes), to changes in incomes of the middle and upper-middle class (experiencing more modest tax changes). This difference-in-differences of (log) incomes is then divided by the corresponding difference-in-differences of (log) net-of-tax rates to obtain an elasticity estimate of the following form:

$$\hat{e} = \frac{\Delta \log(z^H) - \Delta \log(z^M)}{\Delta \log(1-\tau^H) - \Delta \log(1-\tau^M)}$$

where z^H, z^M and τ^H, τ^M denote the incomes and marginal tax rates of the high (H) and middle (M) income groups, respectively, and Δ denotes the changes from before to after the tax change. But suppose that the middle class has a zero elasticity, so that $\Delta \log(z^M) = 0$, and that high-income individuals have an elasticity of e, so that $\Delta \log(z^H) = e\Delta\log(1-\tau^H)$. Assume further that the middle class experiences an increase in its net-of-tax rates that is half as large as that experienced by the high-income taxpayers, so

[11] Feldstein and Feenberg (1996) note a decrease in top reported incomes from 1992 to 1993 and interpret this finding as evidence of large behavioral elasticities. As compensation of executives continued to soar throughout the late 1990s, negative long-run elasticity estimates would be obtained by repeating Goolsbee's (2000a) analysis and comparing incomes in 1992 to those of the late 1990s.

that $\Delta \log(1 - \tau^M) = 0.5 \cdot \Delta \log(1 - \tau^H)$. Then the estimated elasticity $\hat{e}$ will be twice the true elasticity e of the high-income group, a dramatic upward bias in the estimate. This simple but realistic example shows that it is not appropriate to rely on comparisons of the responsiveness of the reported incomes of the middle- and upper-income groups when there is a strong suspicion that the behavioral elasticities for the two groups are quite different.

Fourth, the increases in top incomes following the 1980s tax changes might have been due partly to income shifting rather than the creation of new income. As I show below, the critical distinction for policy and welfare analysis is whether the increase in reported incomes comes at the expense of untaxed activities (for example, leisure, fringe benefits, and perquisites) or taxed activities (for example, profits in the corporate sector, future capital gains, and deferred compensation such as pensions). Slemrod (1996) points out that part of the surge in top incomes following TRA 1986 was due to a dramatic increase in S-corporation income, suggesting that many businessowners switched the legal form of their corporations from Subchapter C (which faces the corporate income tax on profits) toward Subchapter S (which does not face the corporate tax and whose profits are taxed directly at the individual level) because the top individual income tax rate became lower than the corporate income tax rate by 1988.[12] Carroll and Joulfaian (1997) explore this issue in more detail using a panel of corporations from 1985 to 1990, and they confirm Slemrod's (1996) earlier findings. Gordon and Slemrod (2000) perform a systematic study of income shifting by analyzing simultaneously tax changes and reported incomes at the corporate and personal level. In this paper, I analyze in detail the composition of reported individual incomes to cast light on the source of the changes in reported incomes following tax reforms.

The early studies by Lindsey (1987) and Feenberg and Poterba (1993) used the large and stratified annual cross-sectional public-use tax return data to document the evolution of top reported incomes. Following Feldstein's (1995) influential analysis of the TRA 1986, several studies have used panel data to estimate elasticities. The main justification for

[12] A C-corporation faces the corporate tax on its profits. Profits are then taxed again at the individual level if they are paid out as dividends. If profits are retained in the corporation, they may generate capital gains that are taxed at the individual level, but in general would be taxed more favorably than dividends, when they are realized. Profits from S-corporations (or partnerships and sole proprietorships) are taxed directly and solely at the individual level. Distributions from S-corporations to individual owners generate no additional tax. Thus, an S-corporation is fiscally more advantageous than a C-corporation the lower the individual tax rate, the higher the corporate tax rate, and the higher the capital gains tax rate. See Scholes and Wolfson (1992, Chapter 4) for extensive details and examples. A business can switch to and from the C and S status, but an S-corporation cannot have more than a limited number of stockholders (75 currently), issue more than one class of stock, or be a subsidiary of other corporations.

using panel data instead of repeated cross-sections was that they might alleviate the issue of non-tax-related changes in income inequality because the same individuals are followed before and after the reform. It is plausible to think, however, that an increase in income inequality might be due mostly to high-income individuals experiencing larger gains than do lower-income individuals; in which case, a panel analysis does not solve the issue. Furthermore, a tax cut might induce middle-income people to try harder to become rich, and this behavioral response will be missed by a Feldstein-type panel data analysis.

The use of panel data has two additional important drawbacks. First, the publicly available panel of tax returns is not stratified and hence does not allow nearly as precise a study of the evolution of top incomes as does the large, stratified cross-sections.[13] Second, comparing groups ranked according to pre-reform incomes generates a mean reversion problem: if there is mobility in incomes from year to year, then it can cause high-income taxpayers in one year to appear in low-income brackets in the next, aside from any true behavioral response.[14] Eliminating this mobility bias requires control of pre-reform income in the estimation, but this approach will weaken and possibly destroy identification because the size of net-of-tax-rates changes is closely correlated with income.[15]

Many authors, including Lindsey (1987) himself, have argued that comparing income groups using repeated cross-sections is a valid strategy only if taxpayers stay in the same groups from year to year. Following a tax rate cut such as ERTA 1981 or TRA 1986, however, one would like to know how the distribution of reported income has changed relative to a scenario where the tax change does not take place. Whether there is mobility in incomes from year to year is independent of this question as long as the income distribution is stationary (without the tax change). In contrast, mobility in incomes is precisely what complicates the panel data analysis. Panel data have key advantages, however, for studying some questions more subtle than the overall response of reported incomes. For example, if one wants to study how a tax change affects income mobility

[13] Auten and Carroll (1999) have used a larger panel available only at the U.S. Treasury to compare years 1985 and 1989. It is difficult, however, to create longer panels to analyze longer-term time series because of attrition issues.

[14] This would generate a downward bias in the elasticity estimates in the case of a tax rate decrease, such as TRA 1986, and an upward bias in the case of a tax rate increase, such as OBRA 1993.

[15] This point is discussed in Gruber and Saez (2002), who overcome this problem by using many years instead of just two in the analysis. The implicit assumption they make, however, is that mobility remains stable from year to year.

(i.e., do more middle-income taxpayers become successful entrepreneurs following a tax rate cut?), panel data is clearly necessary.

Measuring the tax-induced change in the income distribution is exactly what is needed to derive the tax revenue consequences of the tax change. Because we do not observe the counterfactual income distribution when no tax change takes place, we have to rely on income distributions from previous years, and there is no systematic bias in the repeated cross-section analysis as long as the income distribution remains stationary, without the tax change. The direct focus on the income distribution series over time allows a much more concrete and simple grasp of the evolution of incomes for different groups than does panel analysis because it is straightforward to divide the population into various percentiles for each year and to analyze simultaneously the evolution of the incomes and the marginal tax rates of these groups. By relating the changes in incomes to the changes in net-of-tax rates, we can obtain elasticity estimates.

Finally, Slemrod (1998) and Slemrod and Kopczuk (2002) make the important point that the elasticity of reported incomes with respect to tax rates might not be a fixed parameter, and it depends on the legal details and the enforcement of the tax system. For example, if it is easy for corporations to switch from Subchapter C to Subchapter S to avoid taxes, the individual tax base might be much more elastic than in a setting where Subchapter S corporations do not exist. Kopczuk (2003) performs an empirical analysis of this issue for the United States from 1979 to 1990 and shows that taxable income elasticities are negatively related to the base of incomes subject to taxes. This result suggests that introducing additional deductions increases the responsiveness of taxable incomes. Goolsbee (1999) studies the key tax changes in the United States since the 1920s and finds enormous heterogeneity in the observed responses from episode to episode, although he does not try to explain the discrepancies. The present analysis of the period 1960–2000 also displays significant heterogeneity in responses over time.

2.2 *Using Elasticities for Tax Policy*

The empirical analysis that follows will show that evidence of behavioral responses to changes in marginal tax rates is concentrated in the top of the income distribution, with little evidence of any response for the middle-income and upper-middle-income class.[16] Therefore, it is useful to focus

[16] The low end of the income distribution is beyond the scope of this paper because many low-income families and individuals do not file income tax returns. The large amount of research on responses to welfare and income transfer programs targeted toward low-income earners has displayed evidence, however, of significant labor supply responses. See Meyer and Rosenbaum (2001), for example, for a recent analysis.

on the analysis of the effects of increasing the marginal tax rate on the upper end of the income distribution. Therefore, let us assume that incomes in the top bracket, above a given threshold $\bar{z}$, face a constant marginal tax rate τ.[17] N is the number of taxpayers in the top bracket.

Assume that incomes reported in the top bracket depend on the net-of-tax rate $1 - \tau$, and $z\ (1 - \tau)$ denotes the *average* income reported by taxpayers in the top income bracket. As discussed above, income effects in the analysis are ignored, and thus the net-of-tax rate is the only relevant parameter. The elasticity (compensated or uncompensated because there are no income effects) of income in the top bracket with respect to the net-of-tax rate is therefore defined as $e = [(1 - \tau)/z]\partial z/\partial(1 - \tau)$. Suppose that the government increases the top income tax rate τ by a small amount $d\tau$ (with no change in the tax schedule for incomes below $\bar{z}$). This small tax reform has two effects on tax revenue. First, there is a mechanical increase in tax revenue because taxpayers face a higher tax rate on their incomes above $\bar{z}$. Hence, the total mechanical effect is:

$$dM = N[z - \bar{z}]\,d\tau$$

This mechanical effect is the projected increase in tax revenue, without any behavioral response.

Second, the increase in the tax rate triggers a behavioral response that reduces the average reported income in the top bracket by $dz = -e \cdot z \cdot d\tau\ /\ (1 - \tau)$ on average, and hence it produces a loss in tax revenue equal to:

$$dB = -N \cdot e \cdot z \cdot \frac{\tau}{1 - \tau}\,d\tau$$

Summing the mechanical and the behavioral effect, I obtain the total change in tax revenue due to the tax change:

$$dR = dM + dB = Nd\tau(z - \bar{z}) \cdot \left[1 - e \cdot \frac{z}{z - \bar{z}} \cdot \frac{\tau}{1 - \tau}\right]$$

Let us use a to denote the ratio $z/(z - \bar{z})$. Note that $a \geq 1$ and that $a = 1$ when $\bar{z} = 0$, that is, when there is a single flat tax rate applying to all incomes. If the top tail of the distribution is Pareto distributed, then the parameter a does not vary with $\bar{z}$ and is exactly equal to the Pareto parameter.[18] Because the tails of actual income distributions are closely approximated by Pareto distributions, it turns out that the coefficient a is

[17] In the case of the 2003 tax law, for example, taxable incomes above $\bar{z}$ = $311,950 are taxed at the top marginal tax rate of r = 35 percent.

[18] A Pareto distribution has a density function of the form $f(z) = C/z^{1+\alpha}$, where C and α are constant parameters; α is called the Pareto parameter.

extremely stable for $\bar{z}$ above \$200,000. Saez (2001) provides such an empirical analysis for 1992 and 1993 incomes using tax return data. The parameter a measures the thinness of the top tail of the income distribution: the thicker the tail of the distribution, the larger z is relative to $\bar{z}$, and hence the smaller is a. Feenberg and Poterba (1993) provide estimates of the Pareto parameter a from 1951 to 1990 for the distribution of adjusted gross income (AGI) in the United States using income tax returns. They show that a has decreased from about 2.5 in the early 1970s to around 1.5 in the late 1980s.[19]

We can rewrite the effect of the small reform on tax revenue dR simply as:

$$dR = dM\left[1 - \frac{\tau}{1-\tau} \cdot e \cdot a\right] \tag{1}$$

Equation (1) is of central importance. It shows that the fraction of tax revenue lost through behavioral responses—the second term in the square bracket expression—is a simple function increasing in the tax rate τ, the elasticity e, and the Pareto parameter a. This expression is also equal to the marginal deadweight burden created by the increase in the tax rate. More precisely, because of the envelope theorem, the behavioral response creates no additional welfare loss because individuals are maximizing utility, and thus the utility loss (in dollar terms) created by the tax increase is exactly equal to the mechanical effect dM. However, tax revenue collected is only $dR = dM + dB$, with $dB < 0$. Thus, $-dB$ represents indeed the extra amount lost in utility over and above the tax revenue collected, dR. The marginal excess burden expressed in terms of extra taxes collected is simply:

$$-\frac{dB}{dR} = \frac{e \cdot a \cdot \tau}{1 - \tau - e \cdot a \cdot \tau} \tag{2}$$

These formulas are valid for any tax rate τ and income distribution, even if individuals have heterogeneous utility functions and behavioral elasticities, as long as income effects are assumed away.[20] Thus, this formula should be preferred to the Harberger triangle approximations, which require small tax rates to be valid. The parameters τ and a are straightforward to obtain; the elasticity parameter e is thus the central nontrivial parameter necessary to make use of equations (1) and (2). For example, in 2000, for the top 1 percent income cutoff (corresponding

[19] Piketty and Saez (2003) provide estimates of thresholds $\bar{z}$ and average incomes z corresponding to various fractiles within the top decile of the U.S. income distribution from 1913 to 2000. This approach allows a straightforward estimation of the parameter a for any year and income threshold.

[20] The elasticity e is the average (income weighted) of individual elasticities.

approximately to the top 39.6 percent federal income tax bracket in that year), Piketty and Saez (2003) estimate that $a = 1.6$. For an elasticity estimate $e = 0.5$, corresponding to the mid- to upper range of the estimates from the literature, the fraction of tax revenue lost through behavioral responses (dB/dM), should the top tax rate be increased slightly, would be 52.5 percent, more than half of the mechanical projected increase in tax revenue. In terms of marginal excess burden, increasing tax revenue by \$1 requires the creation of a utility loss of $1/(1 - .525) = \$2.11$ for taxpayers, and hence a marginal excess burden of \$1.11, or 111 percent of the extra \$1 tax collected.

Following the supply-side debates of the early 1980s, much attention has been focused on the tax rate which maximizes tax revenue, the so-called Laffer rate. The Laffer rate τ^* maximizes tax revenue; hence, the bracketed expression in equation (1) is exactly zero when $\tau = \tau^*$. Rearranging the equation, we obtain the following simple formula for the Laffer tax rate τ^* for the top bracket:

$$\tau^* = \frac{1}{1 + a \cdot e} \tag{3}$$

A top tax rate above the Laffer rate is an inefficient situation because decreasing the tax rate would increase both government revenue and the utility of high-income taxpayers.[21] At the Laffer rate, the excess burden becomes infinite because raising more tax revenue becomes impossible. Using our previous example with $e = 0.5$ and $a = 1.6$, the Laffer rate τ^* would be 55.6 percent, not much higher than the combined maximum federal, state, Medicare, and sales tax rate. Note that when $\bar{z} = 0$ and the tax system has a single tax rate, the Laffer rate becomes the well-known expression $\tau^* = 1/(1 + e)$. Because $a \geq 1$, the flat rate maximizing tax revenue is always larger than the Laffer rate for high incomes only. Increasing the top tax rate collects extra taxes only on the portion of incomes above the bracket threshold $\bar{z}$ but produces a behavioral response for high income taxpayers as large as an across-the-board increase in marginal tax rates.

The analysis has assumed so far that the reduction in incomes due to the tax rate increase has no other effect on tax revenue. This assumption

[21] When the government has strong redistributive tastes and does not value the marginal consumption of high-income individuals relative to the average individual, the optimal income tax rate for high-income individuals is exactly equal to the Laffer rate in equation (3). When the government generally values the marginal consumption of high-income individuals at $0 \leq g < 1$, the optimal tax rate for the high-income individuals is such that the bracketed expression in equation (1) is equal to g. See my earlier work (Saez, 2001) for a more detailed exposition following the classical optimal income tax theory of Mirrlees (1971).

is reasonable if the reduction in incomes is due to reduced labor supply (and hence an increase in untaxed leisure time) or to a shift from cash compensation toward untaxed fringe benefits or perquisites (more generous health insurance, better offices, company cars, etc.). In many instances, however, the reduction in reported incomes is due in part to a shift away from individual income toward other forms of taxable income such as corporate income, or deferred compensation, that will be taxable to the individual when paid out (see Slemrod, 1998). For example, Slemrod (1996) and Gordon and Slemrod (2000) show convincingly that part of the surge in top incomes after the Tax Reform Act of 1986 was due to a shift of income from the corporate sector toward the individual sector. I will cover this topic in detail later.

Therefore, let us assume that the incomes that disappear from the individual income tax base following the tax rate increase $d\tau$ are shifted to other bases taxed at rate t on average. For example, if two-thirds of the reduction in individual reported incomes is due to increased leisure and one-third is due to a shift toward the corporate sector, t would be one-third of the corporate tax rate because leisure is untaxed. In that case, it is straightforward to show that equation (1) becomes:

$$dR = dM\left[1 - \frac{\tau - t}{1 - \tau} \cdot e \cdot a\right] \tag{4}$$

The same envelope theorem logic applies for welfare analysis, and the marginal deadweight burden formula is also modified accordingly by replacing $e \cdot a \cdot \tau$ by $e \cdot a \cdot (\tau - t)$ in both the numerator and denominator of equation (2). The Laffer rate in equation (3) becomes:

$$\tau^* = \frac{1 + t \cdot a \cdot e}{1 + a \cdot e} \tag{5}$$

If we assume again that $a = 1.6$ and $e = .5$, but that incomes disappearing from the individual base are taxed at $t = 20$ percent on average, the fraction of revenue lost due to behavioral responses drops from 52.5 to 26 percent, and the marginal excess burden (expressed as a percentage of extra taxes raised) decreases from 111 to 35 percent if the initial top tax rate is $\tau = 39.6$ percent. The Laffer rate increases from 55.6 to 64.5 percent. This simple theoretical analysis shows therefore that, in addition to estimating the elasticity e, it is critical to analyze the source or destination of changes in reported individual incomes.

2.3 *Data and Methodology*

I estimate the level and shares of total income accruing to various upper-income groups using the large cross-sectional individual tax return data

annually released by the Internal Revenue Service (IRS) since 1960.[22] The data are a stratified sample of tax returns oversampled for high-income taxpayers, which allows an extremely precise analysis of top reported incomes. The top income shares are estimated based on the Piketty and Saez (2003) analysis.[23] The unit of analysis is the tax unit defined as a married couple living together (with dependents) or a single adult (with dependents), as in the current tax law. It is important to note that top income shares series measured at the tax unit level, as I do here, might be different from series estimated at the individual level. As displayed in Table 1, since 1960, the average number of individuals per tax unit has decreased from 2.6 to 2.1 because of the decrease in the average number of dependent children per tax unit as well as the decrease in the fraction of married tax units. Those long-term demographic changes imply that real average income growth per tax unit will be substantially smaller than real income growth per capita. These demographic changes can also affect top income shares if the reduction in tax unit size is not uniform across income groups. However, the tax return data show that the reduction in tax unit size has been about the same for high-income taxpayers as it has for the U.S. population as a whole. From 1960 to 2000, the number of individuals per tax unit in the top decile has declined from 3.6 to 2.9, which is the same 20 percent decline as in the general population (from 2.6 to 2.1).

From 1960 to 2000, the fraction of married tax units has declined from about 60 to 50 percent for the total population (due to the increased number of single parents and unmarried couples) but only from 90 to 85 percent for the top decile tax units. An increase in single tax units with lower incomes contributes to increasing top income shares. Similarly, an increase in the correlation of earnings between spouses (due, for example, to the increased labor force participation of married women) would also increase top income shares estimated at the tax unit level. Those slow moving demographic changes are small, however, relative to the dramatic trends I document and can explain at best only a small fraction of the changes in the top most income shares.

Each upper-income group is defined relative to the total number of potential tax units in the entire U.S. population, estimated from population and family census data as the sum of married men, divorced and widowed men and women, and single adults never married (age 20 and

[22] There is no micro data for years 1961, 1963, and 1965.

[23] The main (and very minor) difference is that government transfers such as social security benefits and unemployment compensation have been excluded from the income definition in this paper to obtain better consistency in the income definition over the years. The estimates have been extended to year 2000.

TABLE 1
Reference Totals for Population, Income, and Inflation, 1960-2000

	Tax Units and Population					Total Income			Wage earners and wage income				Inflation indexes	
	Tax Units (000s) (1)	*Number of tax returns (000s) (2)*	*(2)/(t) (%) (3)*	*Population (000s) (4)*	*(4)/(1) (5)*	*Total Income (millions 2000 $ CPI-U) (8)*	*Average Income (2000 $, CPI-U) (9)*	*Average marginal tax rate (%) (10)*	*Tax units with wages (11)*	*Total wages (millions 2000 $, CPI-U) (12)*	*Average wages (2000 $, CPI-U) (13)*	*Average marginal tax rate (%) (14)*	*CPI-U (2000 base) (15)*	*CPI-U-RS (2000 base) (16)*
1960	68,681	61,028	88.9	180,671	2.63	1,850,218	26,939	22.55	52,554	1,587,214	30,201	22.68	17.189	20.183
1961	69,997	61,499	87.9	183,691	2.62	1,907,985	27,258		51,946	1,615,622	31,102		17.361	20.385
1962	71,254	62,712	88.0	186,538	2.62	2,011,233	28,226	23.32	53,338	1,705,361	31,972	23.35	17.552	20.609
1963	72,464	63,943	88.2	189,242	2.61	2,099,285	28,970		53,893	1,772,347	32,886		17.762	20.856
1964	73,660	65,376	88.8	191,889	2.61	2,236,911	30,368	21.64	55,216	1,877,056	33,995	21.66	17.993	21.127
1965	74,772	67,596	90.4	194,303	2.60	2,361,753	31,586		57,239	1,987,572	34,724		18.299	21.486
1966	75,831	70,160	92.5	196,560	2.59	2,500,162	32,970	21.30	60,358	2,125,707	35,219	21.19	18.830	22.110
1967	76,856	71,652	93.2	198,712	2.59	2,600,178	33,832	21.62	61,571	2,213,824	35,955	21.59	19.376	22.751
1968	77,826	73,729	94.7	200,706	2.58	2,719,064	34,938	24.33	62,836	2,337,364	37,198	24.10	20.190	23.662
1969	78,793	75,834	96.2	202,677	2.57	2,794,675	35,469	25.53	64,371	2,435,448	37,834	25.15	21.280	24.693
1970	79,924	74,280	92.9	205,052	2.57	2,845,542	35,603	24.11	63,778	2,447,144	38,370	24.20	22.535	25.882
1971	81,849	74,576	91.1	207,661	2.54	2,905,636	35,500	23.06	63,194	2,484,179	39,311	23.29	23.527	27.031
1972	83,670	77,573	92.7	209,896	2.51	3,093,721	36,975	23.62	64,750	2,630,468	40,625	23.73	24.280	27.864
1973	85,442	80,693	94.4	211,909	2.48	3,225,502	37,751	24.77	67,614	2,748,251	40,646	24.68	25.785	29.608
1974	87,228	83,340	95.5	213,854	2.45	3,195,330	36,632	25.82	68,518	2,697,802	39,373	25.61	28.621	32.541
1975	89,127	82,229	92.3	215,973	2.42	3,093,548	34,709	25.40	66,671	2,609,012	39,132	25.91	31.226	35.236
1976	91,048	84,670	93.0	218,035	2.39	3,235,043	35,531	26.04	68,459	2,722,938	39,775	26.53	33.037	37.257
1977	93,076	86,635	93.1	220,239	2.37	3,339,935	35,884	27.71	70,898	2,825,066	39,847	28.33	35.185	39.635
1978	95,213	89,771	94.3	222,585	2.34	3,480,248	36,552	29.16	74,503	2,961,075	39,745	29.87	37.859	41.340
1979	97,457	92,694	95.1	225,055	2.31	3,503,689	35,951	29.19	77,038	2,979,812	38,680	30.04	42.137	45.224

1980	99,625	93,902	94.3	227,726	2.29	3,412,006	34,248	30.66	76,913	2,880,118	37,446	31.77	47.825	50.258
1981	101,432	95,396	94.0	229,966	2.27	3,419,549	33,713	31.68	77,439	2,876,292	37,143	32.95	52.751	54.974
1982	103,250	95,337	92.3	232,188	2.25	3,405,788	32,986	29.22	75,771	2,844,255	37,537	30.71	56.022	58.185
1983	105,067	96,321	91.7	234,307	2.23	3,466,971	32,998	27.36	76,260	2,913,254	38,202	28.90	57.814	60.602
1984	106,871	99,439	93.0	236,348	2.21	3,637,968	34,041	26.99	80,008	3,075,930	38,445	28.36	60.300	63.020
1985	108,736	101,660	93.5	238,466	2.19	3,760,935	34,588	27.27	81,936	3,193,778	38,979	28.59	62.471	65.161
1986	110,684	103,045	93.1	240,651	2.17	3,876,141	35,020	27.26	83,340	3,321,487	39,855	28.77	63.658	66.310
1987	112,640	106,996	95.0	242,804	2.16	4,046,941	35,928	24.47	85,618	3,442,337	40,206	25.98	65.950	68.569
1988	114,656	109,708	95.7	245,021	2.14	4,305,720	37,553	22.92	88,121	3,572,571	40,542	24.75	68.654	71.066
1989	116,759	112,136	96.0	247,342	2.12	4,350,842	37,263	23.06	90,145	3,609,277	40,039	24.65	71.949	74.158
1990	119,055	113,717	95.5	250,132	2.10	4,377,181	36,766	23.05	91,348	3,632,403	39,764	24.77	75.834	77.883
1991	120,453	114,730	95.2	253,493	2.10	4,286,889	35,590	23.11	89,813	3,574,052	39,794	24.61	79.019	80.737
1992	121,944	113,605	93.2	256,894	2.11	4,356,547	35,726	22.99	89,883	3,645,188	40,555	24.91	81.390	82.878
1993	123,378	114,602	92.9	260,255	2.11	4,320,595	35,019	23.94	91,279	3,687,902	40,402	25.60	83.832	85.018
1994	124,716	115,943	93.0	263,436	2.11	4,424,217	35,474	24.29	93,270	3,783,593	40,566	25.82	86.011	86.881
1995	126,023	118,218	93.8	266,557	2.12	4,581,375	36,353	24.58	95,388	3,891,745	40,799	26.29	88.419	89.061
1996	127,625	120,351	94.3	269,667	2.11	4,730,336	37,064	24.75	97,338	3,986,011	40,950	26.65	91.072	91.478
1997	129,301	122,422	94.7	272,912	2.11	4,974,958	38,476	25.33	100,161	4,170,993	41,643	27.32	93.167	93.460
1998	130,945	124,771	95.3	276,115	2.11	5,268,063	40,231	25.56	103,069	4,429,422	42,975	27.79	94.657	94.768
1999	132,267	127,075	96.1	279,295	2.11	5,522,779	41,755	25.84	105,233	4,626,416	43,963	28.39	96.740	96.750
2000	133,589	129,272	96.8	282,339	2.11	5,705,414	42,709	26.13	107,693	4,836,329	44,909	28.99	100.000	100.000

Notes: Population and tax unit estimates based on census and current population surveys (Historical Statistics of the United States, and Statistical Abstract of the United States).

Tax units estimated as sum of married men, divorced and widowed men and women, and singles men and women aged 20 and over.

Income defined as adjusted gross income less realized capital gains, taxable social security and unemployment insurance benefits and adding back all adjustments to gross Income. Income of nonfilers is imputed as 20 percent of average income.

Marginal tax rates are weighted by income and estimated using TAXSIM calculator (see Feenberg and Coutts, 1993) and the tax return micro-files and ignoring interactions with state income taxes.

Marginal income tax rate in column (10) is a weighted average of marginal tax rate on earned income and other income.

Tax units with wages defined as the total number of employees (from National Income and Product Accounts) less number of married women employed (from Statistical Abstract of the United States).

Total wages from total compensation of employees from National Income and Product Accounts.

Marginal income tax rate in column (14) is the average (wage income weighted) marginal tax rate on wages and salaries.

Consumer Price Index (CPI-U) is the official CPI index from Economic Report of the President. CPI-U-RS includes retrospectively improvements on CPI estimation method for the 1967–1998 period.

above).[24] The income definition I use is consistent over time and includes all income items except realized capital gains reported on tax returns and before all deductions such as adjustments to gross income, exemptions, and itemized and standard deductions.[25] I exclude government transfers such as social security (SS) benefits and unemployment insurance (UI) benefits. Thus, my income measure is defined as adjusted gross income (AGI) less realized capital gains included in AGI, less taxable SS and UI benefits, plus all the adjustments to gross income. Hence, my measure of income is a broader measure than taxable income, on which many previous studies have focused.

If deductions to income, such as charitable giving, mortgage interest payments, etc., are also responsive to taxation, taxable income might be more responsive to tax rates than my broader income measure. Because the nature of deductions allowed has changed substantially over the period 1960–2000, however, it is impossible to construct a consistent taxable income definition over the full period. As a result, refer to previous studies analyzing specifically the components of taxable income that I exclude from the analysis.

As in Piketty and Saez (2003), I consider various groups within the top decile of the income distribution. To get a more concrete sense of those upper-income groups, Table 2 displays the thresholds, the average income level in each group, and the number of tax units in each group, all for 2000. The median income as well as the average income for the bottom 90 percent of tax units, are quite low, around $25,000. Those numbers are smaller than those reported by the Census Bureau based on the Current Population Survey (CPS) for two reasons. First, my income definition does not include any government transfers. Second, CPS income is reported at the household level, which is a larger unit than the tax unit I consider.[26]

The groups in the top decile below the top 1 percent (the top 10–5 percent denotes the bottom half of the top decile, and the top 5–1 percent denotes the next four percentiles) have average incomes of $100,000 and $160,000, respectively, which corresponds to the popular view of the middle-income and upper-middle-income class (perhaps surprisingly given how

[24] From 1960 to 2000, between 90 and 95 percent of potential tax units actually filed an income tax return because many nontaxable families file to get tax refunds.

[25] Realized capital gains are excluded because they form a volatile component of income and face in general a different tax treatment than do other forms of income. Much of the literature focuses on the response of capital gains realizations to tax changes. See Auerbach (1988) for a survey.

[26] For example, a cohabiting couple or two roommates form a single household but are two separate taxpayers.

TABLE 2

Thresholds and average incomes in top income groups in 2000

Percentile threshold (1)	Income threshold (2)	Income groups (3)	Number of tax units (4)	Average income in each group (5)
		Full population	133,589,000	$42,709
Median	$25,076	Bottom 90%	120,230,100	$26,616
Top 10%	$87,334	Top 10–5%	6,679,450	$100,480
Top 5%	$120,212	Top 5–1%	5,343,560	$162,366
Top 1%	$277,983	Top 1–0.5%	667,945	$327,970
Top .5%	$397,949	Top 0.5–0.1%	534,356	$611,848
Top .1%	$1,134,849	Top 0.1–0.01%	120,230	$2,047,801
Top .01%	$5,349,795	Top 0.01%	13,359	$13,055,242

Notes: Computations are based on income tax return statistics.

Income is defined as annual gross income reported on tax returns excluding capital gains and all government transfers (such as social security, unemployment benefits, welfare payments, etc.) and before individual income taxes and employees' payroll taxes. Amounts are expressed in 2000 dollars.

Column (2) reports the income thresholds corresponding to each of the percentiles in column (1). For example, an annual income of at least $87,334 is required to belong to the top 10 percent tax units, etc.

far up the income distribution those groups are). In 2000, an annual family income of at least $280,000 is required to be part of the top 1 percent. Hence, the top 1 percent corresponds perhaps to the popular view of the high-income tax payers. About 140,000 tax units (or slightly more than 0.1 percent of all tax units) report incomes larger than $1 million (the high-income taxpayers). Finally, the top .01 percent, the smallest top group I consider, is formed by the top 13,400 tax units, who reported, on average, $13 million of annual income in 2000. These are the super-high-income American families.

I estimate shares of income by dividing the income amounts accruing to each group by reported income, and I have assumed that nonfiling units earn 20 percent of the average income.[27] I then estimate the composition of income for each group and consider seven components: salaries and wages (including exercised stock options, bonuses, and private pensions), S-corporation income, sole proprietorship (Schedule C income) and farm income, partnership income, dividends, interest income, and other income (including smaller items such as rents, royalties, and other miscellaneous items).

Marginal tax rates are estimated using the TAXSIM tax calculator. For each individual record, I compute a weighted marginal tax rate based on wage income and other income because various provisions in the tax code

[27] Because only between 5 and 10 percent of tax units do not file returns, my results are not sensitive to this assumption.

generate differences in the tax treatment of wage income and other forms of income. For each income group, I then estimate an average marginal tax rate weighted by income.[28] Note that my marginal tax rate computations ignore state income taxes because the data does not provide state information for high-income earners. My tax measure also ignores other taxes such as social security and Medicare taxes, corporate taxes, and non-income taxes such as sales and excise taxes.

I use the same methodology to compute top wage shares using wages and salaries reported on tax returns. Wages and salaries include exercised stock options and bonuses. In this case, groups are defined relative to the total number of tax units, with positive wage income estimated as the number of part-time and full-time workers from the National Income and Product Accounts less the number of married women who are employees. The sum of total wages in the economy used to compute shares is obtained from the National Income and Product Accounts (total compensation of employees). The marginal tax rates for upper-wage-income groups are, of course, those relevant for wages and salaries and are also weighted by wage income (see Table 1).

I propose a simple time-series regression methodology to obtain various elasticity estimates, and illustrate some of the identification difficulties. Because of potential heterogeneity in elasticities across income groups, all regressions are run for a single income group. The simplest specification consists in regressing log real incomes on log net-of-tax rates (and a constant) for a given group. Of course, as real incomes grow over time, time trends can be added in the regression to control for exogenous (i.e., non-tax-related) real income growth. These estimates are unbiased estimates of behavioral elasticities if, absent any tax change, real incomes in that specific group do not change (first specification) or follow a regular time pattern (second specification). These assumptions may not be met. Because many years of data are included, these estimates capture mostly the long-term behavioral elasticities.[29] As we will see, the pattern of average incomes for the full population does not appear to be related to the evolution of average marginal tax rates. Therefore, to control for average income growth, most of the regressions are run in terms of log income shares instead of log average incomes.[30] These regressions control

[28] As we saw above, for tax policy analysis, it is necessary to weight marginal tax rates by income.

[29] I leave for future research the regression analysis of the dynamics of tax responses. Such a formal analysis has been attempted in the case of capital gains realizations. See, for example, Auerbach (1988).

[30] Slemrod (1996) adopted the same approach, although he controlled for nontax factors explicitly rather than using general time trends controls, as I do here.

automatically for overall income growth. Adding time trends in that case amounts to assuming that incomes for the particular group considered may diverge from the average income in the economy. Because time-series regressions are run and the error terms appear to be correlated over time (according to the standard Durbin-Watson test), Ordinary Least Squares (OLS) standard errors are not correct. Therefore, the Newey-West standard errors are computed, assuming that the error terms can be correlated up to an eight-year lag.[31]

Because of the progressive structure of the income tax, increases in incomes lead to higher marginal tax rates, or bracket creep. As a result, an increase in top income shares (for non-tax-related reasons) might also induce a mechanical increase in the marginal tax rate faced by those high-income taxpayers, hence potentially biasing downward the elasticity estimates. A simple way to investigate the extent of the problem is to use the statutory top marginal income tax rate (or more precisely, the log of 1 minus the top rate) as an instrument for the effective log net-of-tax-rate variable. The results show that the OLS and Instrumental Variables (IV) estimates are extremely close, suggesting that progressive structure of the income tax system and bracket creep do not create a significant estimation problem.

3. INCOME SHARES AND MARGINAL TAX RATES

3.1 Trends in Average Incomes

Figure 1 shows the average federal marginal individual income tax rate (weighted by income) and the average income (per tax unit) reported in real terms for the full population from 1960 to 2000. Incomes are expressed in 2000 dollars using the standard Consumer Price Index–All Urban Consumers (CPI-U) deflator (see Table 1). Figure 1 also shows that real incomes increased quickly from 1960 to 1973 and then increased hardly at all until the early 1990s. From 1993 to 2000, real incomes have increased quickly but are only 13 percent higher than in 1973. Real growth depends critically on the Consumer Price Index (CPI) deflator. Improvements in the CPI estimation have been made over the years, and some of them have been incorporated retrospectively in the so-called Consumer Price Index Research Series using current methods (CPI-U-RS) deflator (see Stewart and Reed, 1999). Using the CPI-U-RS instead of the CPI-U would display about 29 percent real income growth instead of 13 percent from 1973 to 2000 (see Table 1).

[31] An eight-year lag is close to maximizing the size of the standard errors and thus should be seen as conservative.

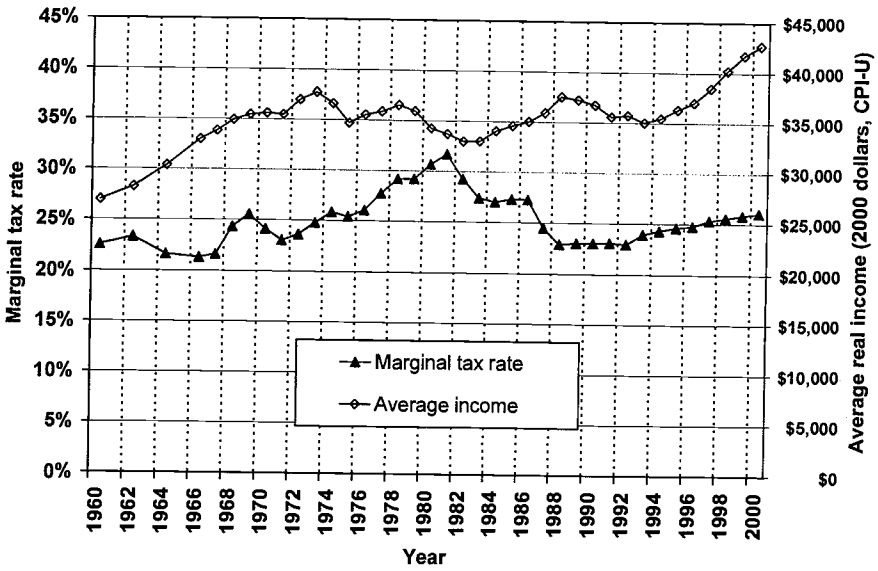

FIGURE 1. ***Average Real Income, Marginal and Average Tax Rate, All Tax Units, 1960–2000***

Note: Based on Table 1.

Average marginal tax rates display significant movements, with a steady increase from 21–22 to 30 percent from the mid-1960s to the early 1980s (with a temporary surge during the Vietnam War surtaxes from 1968 to 1970). In the 1980s, the average marginal tax rate decreased to 23 percent, and it increased slightly to 26 percent during the 1990s. Figure 1 displays no clear relationship between the level of real incomes and the level of marginal tax rates. As displayed in panel A of Table 3, a simple OLS regression of log average incomes on the log of the net-of-tax rate, always displays insignificant elasticity coefficients. Therefore, the aggregate data display no evidence of significant behavioral responses of reported incomes relative to changes in the average marginal tax rate.

Figure 2 shows a striking contrast between the bottom 99 percent tax units (panel A) and the top 1 percent (panel B). The average real income of the bottom 99 percent increased steadily from 1960 to 1973 and then stagnated; real incomes in 2000 are hardly higher than in 1973.[32] The decline in marginal tax rates faced by the bottom 99 percent, from almost

[32] If one uses the CPI-U-RS deflator, the bottom 99 percent of real incomes would have grown by about 13 percent. In any case, it is clear that real growth of incomes has been slow in the last quarter of the twentieth century relative to the 1950–1973 period. It is also important to note that this slow growth is not due to a decrease in the number of adults per tax units (see Table 1).

TABLE 3

Elasticities of income with respect to net-of-tax rates in the aggregate, bottom 99%, and top 1%

	Regression in levels (1)	Regression in levels + time control (2)	Regression in levels + time controls (3)
Panel A: all tax units			
Elasticity	–0.44	–0.02	0.20
	(0.84)	(0.38)	(0.55)
Time trend		Yes	Yes
Time trend square			Yes
Panel B: bottom 99% tax units			
Elasticity	–0.66	–0.41	–0.04
	(0.70)	(0.37)	(0.38)
Time trend		Yes	Yes
Time trend square			Yes
Panel C: top 1% tax units			
Elasticity	1.83	0.71	0.50
	(0.37)	(0.22)	(0.18)
Time trend		Yes	Yes
Time trend square			Yes

Notes: Estimates obtained by time-series regression of log(average real income) (using CPI-U deflator) on a constant, log(1 – average marginal tax rate) from 1960 to 2000 (38 observations). In column 1, simple OLS regression is run, standard errors from Newey-West with 8 lags. In column 2, a time trend is added. In column 3, time ^2 trend is added.

30 percent in 1981 to around 23 percent in 2000, does not seem to have noticeably improved the growth of real incomes. Indeed, as shown in panel B of Table 3, regressing the log average incomes on the log net-of-tax rate for the bottom 99 percent displays negative (although insignificant) coefficients whether or not a time trend is included.

In stark contrast, the average real income of the top 1 percent has increased by 160 percent since the early 1970s (or by 200 percent if one uses the CPI-U-RS), and the average marginal tax rate has also declined substantially, from around 50 percent before 1981 to less than 30 percent by 1988. It is striking to note that the top 1 percent incomes start increasing precisely in 1981, when marginal tax rates start going down. The jump in top incomes from 1986 to 1988 corresponds exactly to the sharp drop in marginal tax rates, from 45 to 29 percent, after the Tax Reform Act of 1986. These points, first noted by Feenberg and Poterba (1993), suggest that high-income taxpayers are indeed quite responsive to taxation. The other striking feature of the figure is the extraordinary increase in top incomes

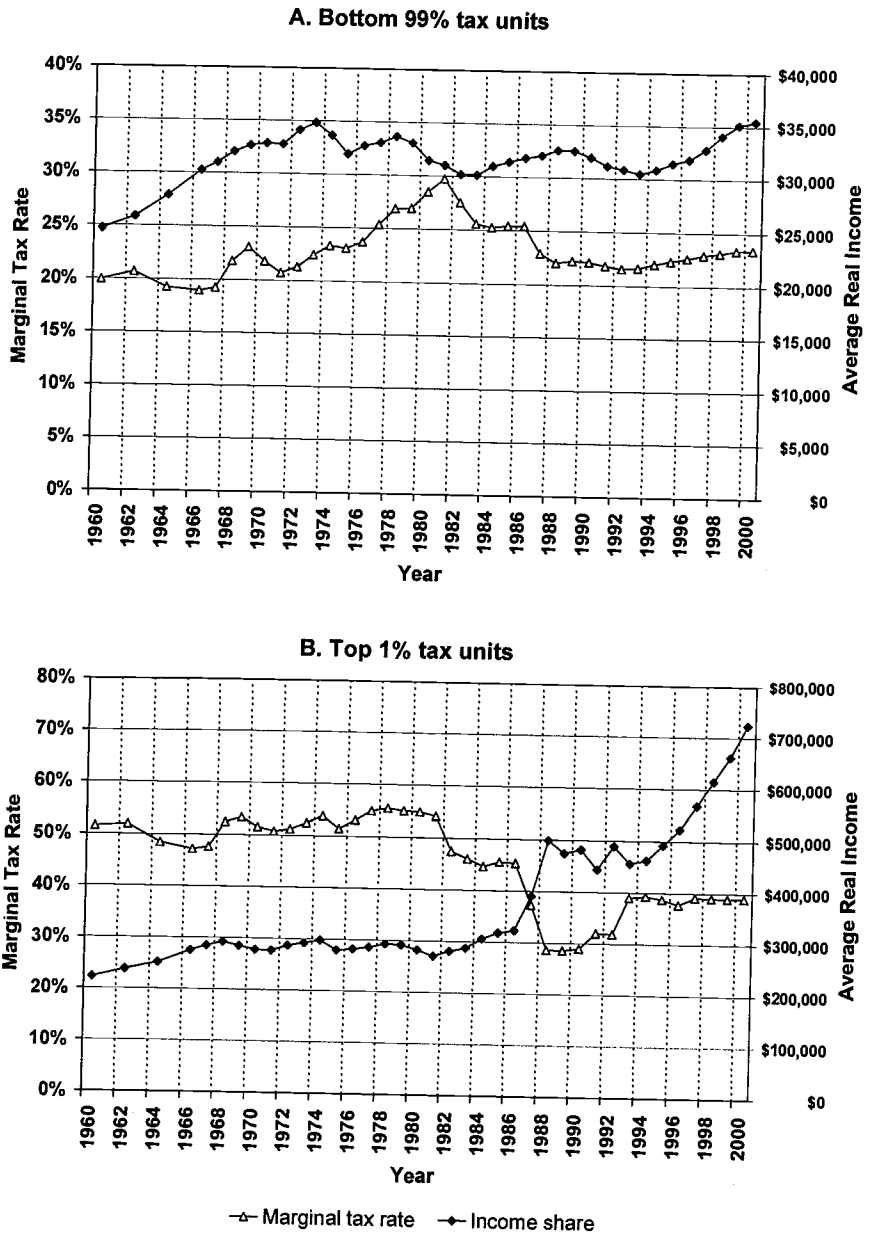

FIGURE 2. *Marginal Tax Rates and Average Real Incomes for the Bottom 99% and the Top 1%*

Note: Series Based on from Tables 1 and 4.

from 1994–2000, in spite of the increase in tax rates, from about 32 percent to almost 40 percent in 1993. Thus, although the marginal tax rates faced by high-income taxpayers in 2000 are hardly lower than in the mid-1980s (39 percent instead of 44–45 percent), top incomes are more than twice as large.

Figure 2 illustrates clearly the difficulty of obtaining convincing estimates of the elasticity of reported income with respect to the net-of-tax rate. It seems obvious that the sharp, and unprecedented, increase in incomes from 1986 to 1988 is related to the large decrease in marginal tax rates that happened exactly during those years. The central issue, however, is whether this short-term response persists over time. In particular, how should we interpret the continuing rise in top incomes since 1994? If one thinks that this surge is evidence of diverging trends between high-income taxpayers and the rest of the population independent of tax policy, which started in the 1970s, then it is tempting to consider the response to TRA 1986 as a purely short-term spike followed by lower growth from 1988 to 1993, before getting back to the normal upward trend by 1994. On the other hand, one could argue that the surge in top incomes since the mid-1990s might have been the long-term consequence of the decrease in tax rates in the 1980s and that such a surge would not have occurred had tax rates for high-income taxpayers remained as high as they did in the 1960s and 1970s. I will return to this point later.

These issues are illustrated formally in the regression results in panel C of Table 3. When no time trend is included in the regression of log income on log net-of-tax rate, all the growth in top incomes is attributed to the decline in top rates, and the elasticity obtained is extremely large 1.83 (.37). In contrast, including a time trend produces a much smaller, although still sizable, elasticity of .71 (.22) because part of the rise in top incomes is attributed to a secular rise. Adding an additional time square control further reduces the elasticity to 0.5 (0.18).

This analysis also shows that comparing two single years by taking the ratio of the difference in log incomes to the difference in log net-of tax rates, as is done in most studies, can produce a wide range of elasticity estimates. Comparing 1981 to 1984, as in Lindsey (1987), produces an elasticity of 0.77.[33] Comparing 1985 and 1988, as in Feldstein (1995) and Auten and Carroll (1999), produces an extremely large 1.7 elasticity.[34] In contrast,

[33] Lindsey (1987) obtains larger estimates because he compares the upper-income to the middle-income groups, creating an upward bias if, as is apparent in the data, elasticities are increasing with income (see discussion in section 2.1).

[34] Auten and Carroll (1999) obtain a much smaller 0.6 elasticity because they compare 1985 to 1989 (instead of 1988, as did Feldstein [1995]) and because of the mean reversion issue discussed in Section 2.1, which is difficult to correct with only two years of data.

comparing 1991 to 1994 (as in Goolsbee, 2000b) produces a zero elasticity because top incomes are about constant, while tax rates increase by almost 10 percentage points.[35] The elasticity would even become negative if one compares 1991 to the late 1990s because both top incomes and the tax rate have increased.[36] The large micro data sets can be used to obtain these simple elasticity estimates directly from regressions at the individual level, as is done in many studies, with small standard errors. The regression counterpart would be to pool the samples of top 1 percent earners for the pre- and postreform years and run a Two Stage Least Squares (2SLS) regression of log incomes on the log net-of-tax rate using as an instrument a postyear dummy.[37] To cast additional light on these issues and try to separate tax effects from other effects, I turn to a closer analysis of various upper-income groups, with particular emphasis on the change in the composition of reported incomes.

3.2 *Trends in Top Income Shares and Marginal Tax Rates*

Average real incomes do not seem to respond to average marginal tax rates in the aggregate, and responses seem to be concentrated in the upper 1 percent of the income distribution. From now on, therefore, top incomes are normalized by considering the shares of total income accruing to various upper-income groups (as in Feenberg and Poterba, 1993, 2000, and Piketty and Saez, 2003). This approach has two advantages. First, the income share measures are independent of the CPI deflator used. Second, the top shares are normalized automatically for overall real and nominal growth in incomes. All the top income share series and corresponding average marginal tax rates (income weighted) are reported in Tables 4 and 5, respectively.

Table 6 displays several regressions of the (log) top 1 percent income share on the log net-of-tax rate, varying the number of time trend controls and instrumenting or not the tax variable with the log net-of-tax top rate. As discussed above, introducing time trends reduces substantially the elasticity, from 1.6 (with no controls) to about 0.6–0.7 (with many controls). After adding linear and square controls in time, the adjusted

[35] In contrast, comparing 1992 to 1993 would produce a significant short-term elasticity of 0.63, as in Feldstein and Feenberg (1996).

[36] Carroll (1998) and Sammartino and Wiener (1997) analyze panel tax return data. They also show that short-term responses around OBRA 1992 are much larger than longer-term responses.

[37] It is doubtful, however, that these small standard errors would be accurate because random year effects are most likely to be present in the data, making 2SLS standard errors far too low and hence worthless (in addition to creating the identification problems discussed in section 2.1). See Bertrand, Duflo, and Mullainathan (2003) for a detailed discussion of these econometric issues.

TABLE 4

Top Income Shares in the United States, 1960–2000

Year	Top 10% (1)	Top 5% (2)	Top 1% (3)	Top .5% (4)	Top .1% (5)	Top .01% (6)	Top 10–5% (7)	Top 5–1% (8)	Top 1–5% (9)	Top .5–1% (10)	Top .1–.01% (11)	Top .01% (12)
1960	31.70	20.81	8.28	5.53	2.13	0.59	10.89	12.53	2.75	3.40	1.54	0.59
1962	32.37	21.23	8.42	5.59	2.10	0.57	11.14	12.81	2.83	3.49	1.53	0.57
1964	32.18	21.04	8.25	5.46	2.05	0.56	11.14	12.78	2.80	3.41	1.49	0.56
1966	32.01	21.01	8.35	5.56	2.14	0.60	11.00	12.66	2.79	3.42	1.54	0.60
1967	32.12	21.12	8.42	5.61	2.15	0.59	11.00	12.70	2.80	3.47	1.56	0.59
1968	32.06	21.03	8.36	5.58	2.13	0.58	11.02	12.67	2.78	3.44	1.56	0.58
1969	31.86	20.72	8.03	5.30	1.99	0.54	11.14	12.70	2.73	3.31	1.45	0.54
1970	31.59	20.45	7.81	5.15	1.92	0.52	11.14	12.64	2.66	3.22	1.40	0.52
1971	31.82	20.54	7.79	5.11	1.90	0.51	11.28	12.76	2.68	3.21	1.39	0.51
1972	31.70	20.43	7.76	5.09	1.90	0.52	11.27	12.67	2.67	3.19	1.39	0.52
1973	31.93	20.64	7.75	5.06	1.87	0.49	11.29	12.89	2.69	3.19	1.38	0.49
1974	32.47	21.12	8.15	5.41	2.09	0.56	11.35	12.98	2.74	3.32	1.53	0.56
1975	32.74	21.14	8.04	5.32	2.02	0.55	11.61	13.09	2.73	3.29	1.47	0.55
1976	32.56	20.97	7.92	5.23	2.00	0.56	11.59	13.04	2.69	3.23	1.45	0.56
1977	32.60	20.99	7.96	5.27	2.03	0.56	11.60	13.04	2.69	3.24	1.47	0.56
1978	32.63	21.05	8.01	5.32	2.07	0.57	11.59	13.03	2.69	3.25	1.49	0.57
1979	32.53	21.01	8.09	5.40	2.15	0.61	11.52	12.91	2.69	3.26	1.54	0.61
1980	33.05	21.36	8.24	5.53	2.22	0.65	11.69	13.11	2.71	3.31	1.57	0.65
1981	32.96	21.16	8.03	5.38	2.17	0.64	11.80	13.13	2.65	3.21	1.54	0.64

Continued

TABLE 4—*Continued*

Year	Top 10% (1)	Top 5% (2)	Top 1% (3)	Top .5% (4)	Top .1% (5)	Top .01% (6)	Top 10–5% (7)	Top 5–1% (8)	Top 1–5% (9)	Top .5–1% (10)	Top .1–.01% (11)	Top .01% (12)
1982	33.81	21.83	8.50	5.79	2.45	0.77	11.99	13.32	2.72	3.34	1.68	0.77
1983	34.37	22.25	8.71	5.99	2.60	0.86	12.12	13.55	2.72	3.39	1.74	0.86
1984	34.54	22.50	8.98	6.26	2.82	0.97	12.03	13.52	2.72	3.44	1.84	0.97
1985	34.86	22.81	9.20	6.44	2.94	0.96	12.05	13.61	2.76	3.50	1.98	0.96
1986	35.20	23.02	9.22	6.41	2.86	0.99	12.18	13.80	2.81	3.55	1.87	0.99
1987	36.68	24.70	10.87	7.83	3.74	1.30	11.98	13.83	3.04	4.09	2.44	1.30
1988	38.85	27.17	13.28	10.02	5.22	1.99	11.68	13.89	3.26	4.80	3.23	1.99
1989	38.70	26.89	12.74	9.45	4.76	1.75	11.82	14.15	3.29	4.69	3.02	1.75
1990	39.12	27.32	13.12	9.79	4.92	1.83	11.81	14.20	3.32	4.88	3.09	1.83
1991	39.00	26.98	12.48	9.12	4.44	1.61	12.02	14.50	3.36	4.68	2.83	1.61
1992	40.36	28.35	13.71	10.25	5.26	2.03	12.01	14.65	3.46	4.99	3.23	2.03
1993	39.99	27.85	13.03	9.58	4.75	1.75	12.14	14.82	3.45	4.83	3.01	1.75
1994	39.93	27.85	13.04	9.57	4.74	1.74	12.08	14.81	3.47	4.82	3.00	1.74
1995	40.54	28.46	13.53	9.99	4.98	1.82	12.08	14.93	3.54	5.00	3.17	1.82
1996	41.14	29.15	14.10	10.48	5.32	1.97	11.99	15.05	3.62	5.16	3.35	1.97
1997	41.70	29.83	14.77	11.12	5.80	2.19	11.87	15.07	3.65	5.31	3.61	2.19
1998	42.06	30.31	15.28	11.60	6.19	2.40	11.74	15.04	3.68	5.41	3.79	2.40
1999	42.59	30.91	15.85	12.14	6.63	2.63	11.68	15.06	3.71	5.51	4.00	2.63
2000	43.91	32.15	16.94	13.10	7.37	3.06	11.76	15.21	3.84	5.73	4.32	3.06

Notes: Computations by authors on tax return statistics. Taxpayers are ranked by gross income (excluding capital gains and government transfers).

Income of nonfilers is imputed as 20 percent of average income. Groups defined relative to all tax units (filers and nonfilers).

The table reports the percentage of total income accruing to each of the top groups. Top 10 percent denotes the top decile, top 10–5% denotes the bottom half of the top decile, etc.

TABLE 5

Marginal Tax Rates (MTR) for Top Income Groups in the United States, 1960–2000

Year	Top 10% (1)	Top 5% (2)	Top 1% (3)	Top .5% (4)	Top .1% (5)	Top .01% (6)	Top 10–5% (7)	Top 5–1% (8)	Top 1–.5% (9)	Top .5–.1% (10)	Top .1–.01% (11)	Top MTR (12)
1960	32.32	37.33	51.47	57.92	69.89	81.30	22.74	27.98	38.50	50.42	65.55	87
1962	33.17	38.02	51.89	58.05	69.07	79.31	23.92	28.91	39.73	51.41	65.27	87
1964	31.19	35.72	48.43	54.00	62.78	70.43	22.65	27.51	37.54	48.71	59.89	77
1966	30.58	34.91	47.13	52.00	59.90	65.22	22.32	26.85	37.42	47.06	57.84	70
1967	31.05	35.49	47.61	52.29	59.67	64.74	22.53	27.46	38.25	47.72	57.74	70
1968	34.55	39.38	52.37	57.03	64.31	67.44	25.32	30.82	43.03	52.51	63.15	75.25
1969	35.56	40.40	53.37	58.04	65.22	68.62	26.54	32.21	44.30	53.72	63.95	77
1970	34.29	39.05	51.53	55.76	61.87	64.28	25.57	31.34	43.33	52.12	60.98	71.75
1971	33.48	38.30	50.73	54.89	61.06	63.50	24.71	30.72	42.78	51.24	60.16	70
1972	34.55	39.42	51.19	54.48	59.36	61.40	25.72	32.22	44.94	51.57	58.60	70
1973	36.19	41.26	52.37	55.36	60.14	63.22	26.91	34.58	46.74	52.55	59.04	70
1974	37.56	42.73	53.79	56.56	61.20	63.68	27.95	35.78	48.32	53.64	60.30	70
1975	36.53	41.12	51.38	54.52	59.34	61.87	28.18	34.82	45.28	51.55	58.38	70
1976	38.32	43.02	53.10	56.04	60.77	64.36	29.82	36.89	47.39	53.10	59.40	70
1977	40.88	45.90	54.93	56.89	60.12	61.74	31.81	40.39	51.09	54.87	59.50	70
1978	42.65	47.43	55.45	57.37	60.62	62.75	33.96	42.50	51.67	55.30	59.80	70
1979	42.57	47.44	54.99	56.53	58.61	59.90	33.70	42.70	51.91	55.15	58.10	70
1980	44.14	48.46	54.84	56.18	57.79	58.79	36.25	44.46	52.10	55.11	57.37	70
1981	45.01	48.72	54.12	55.20	56.11	56.30	38.36	45.41	51.92	54.59	56.03	70
1982	40.60	43.72	47.44	47.45	46.49	44.90	34.92	41.34	47.44	48.15	47.22	50
1983	38.24	41.27	46.07	47.17	47.48	47.15	32.68	38.18	43.66	46.92	47.65	50
1984	37.33	40.22	44.65	45.72	45.88	46.56	31.92	37.28	42.18	45.59	45.53	50
1985	37.74	40.73	45.53	46.81	47.14	47.16	32.09	37.49	42.54	46.53	47.13	50

Continued

TABLE 5—*Continued*

Year	Top 10% (1)	Top 5% (2)	Top 1% (3)	Top .5% (4)	Top .1% (5)	Top .01% (6)	Top 10–5% (7)	Top 5–1% (8)	Top 1–.5% (9)	Top .5–.1% (10)	Top .1–.01% (11)	Top MTR (12)
1986	37.58	40.52	45.34	46.51	47.31	46.72	32.03	37.30	42.66	45.87	47.62	50
1987	33.88	35.85	37.31	37.07	36.93	36.53	29.82	34.69	37.92	37.21	37.14	38.5
1988	29.03	29.46	28.59	27.53	27.33	27.07	28.05	30.29	31.83	27.76	27.49	28
1989	29.10	29.56	28.50	27.42	27.09	26.99	28.05	30.51	31.60	27.75	27.15	28
1990	29.20	29.74	28.91	27.90	27.65	27.57	27.96	30.50	31.90	28.15	27.70	28
1991	29.93	30.99	32.01	31.50	31.29	31.21	27.57	30.11	33.39	31.70	31.35	31
1992	29.87	30.88	31.83	31.34	31.25	31.15	27.47	30.00	33.29	31.42	31.32	31
1993	32.34	34.38	39.01	39.55	39.99	39.83	27.66	30.31	37.50	39.12	40.08	39.6
1994	32.57	34.61	39.27	39.68	39.95	39.80	27.86	30.51	38.14	39.41	40.04	39.6
1995	32.62	34.60	38.74	38.98	39.51	39.46	27.94	30.86	38.04	38.47	39.53	39.6
1996	32.39	34.17	37.74	37.90	38.42	38.38	28.05	30.83	37.26	37.37	38.44	39.6
1997	33.21	35.21	39.15	39.47	39.48	39.35	28.18	31.35	38.16	39.47	39.55	39.6
1998	33.63	35.54	39.05	39.36	39.43	39.37	28.69	31.98	38.07	39.29	39.47	39.6
1999	33.79	35.78	38.94	39.32	39.32	39.19	28.53	32.45	37.67	39.32	39.41	39.6
2000	33.95	36.02	38.83	39.28	39.21	39.01	28.37	32.93	37.27	39.35	39.35	39.6

Notes: Marginal tax rates computed using microfiles of tax returns and the TAXSIM calculator (Feenberg and Coutts, 1993). Marginal tax rates include only federal income taxes and ignore state income taxes. Marginal tax rates are weighted by income and are a weighted average of marginal tax rates on earnings and other income (excluding capital gains).

Column (12) reports the top marginal tax rate. In 1960–1963, the top bracket rate is 91 percent, but there is maximum average tax rate of 87 percent. In 1971–1981, the top marginal tax rate for labor income is lower (see Table D2).

TABLE 6

Elasticities of the top 1% income share with respect to net-of-tax rates

	OLS (Newey-West s.e.) (1)	2SLS (Top rate instrument) (2)	OLS (Newey-West s.e.) (3)	2SLS (Top rate instrument) (4)	OLS (Newey-West s.e.) (5)	2SLS (Top rate instrument) (6)	OLS (Newey-West s.e.) (7)	2SLS (Top rate instrument) (8)
Elasticity	1.58	1.70	0.85	−0.02	0.62	0.59	0.68	0.61
	(0.28)	(0.19)	(0.21)	(0.34)	(0.12)	(0.08)	(0.15)	(0.09)
Time trend			Yes	Yes	Yes	Yes	Yes	Yes
Time trend square					Yes	Yes	Yes	Yes
Time trend cube							Yes	Yes
Adjusted R-square	0.72	0.71	0.86	0.74	0.98	0.98	0.98	0.98
First-stage t-statistics		10.10		5.37		10.1		11.7

Notes: Estimates obtained by time-series regression of log(top 1% income share) on a constant, log(1 – average marginal tax rate), and polynomials time controls from 1960 to 2000 (38 observations). In columns 1, 3, 5, and 7, simple OLS regression is run, standard errors (s.e.) from Newey-West with 8 lags. In columns 2, 4, 6, and 8, 2SLS regression is run using log(1 – top marginal tax rate) as an instrument.

R-square reaches 98 percent, and the elasticity coefficient is not sensitive to adding additional controls. The IV estimates are close in magnitude to the OLS estimates and have a strong first stage [except in the case of column (4) where the first stage is weak]. This finding suggests that the issue of reverse causality because of the progressive nature of the tax schedule is not an important issue. Figure 3 illustrates these issues by plotting, along with the top 1 percent income share series, the fitted values from the regressions with no time controls (line with triangles) and with two time controls (solid line). The line with triangles shows that the pure tax effects explain quite poorly the evolution of the top 1 percent income share. In contrast, the solid line with two time trends captures extremely well the pattern of the top 1 percent income share (the adjusted R-square of the regression is 98 percent). The line with squares in Figure 3 displays the counterfactual pattern, assuming that the marginal tax rate for the top 1 percent had remained constant since 1960. This curve shows that most of the growth in the top 1 percent income share is due to the time trends and that only two out of the nine-percentage-point increase in the top 1 percent income

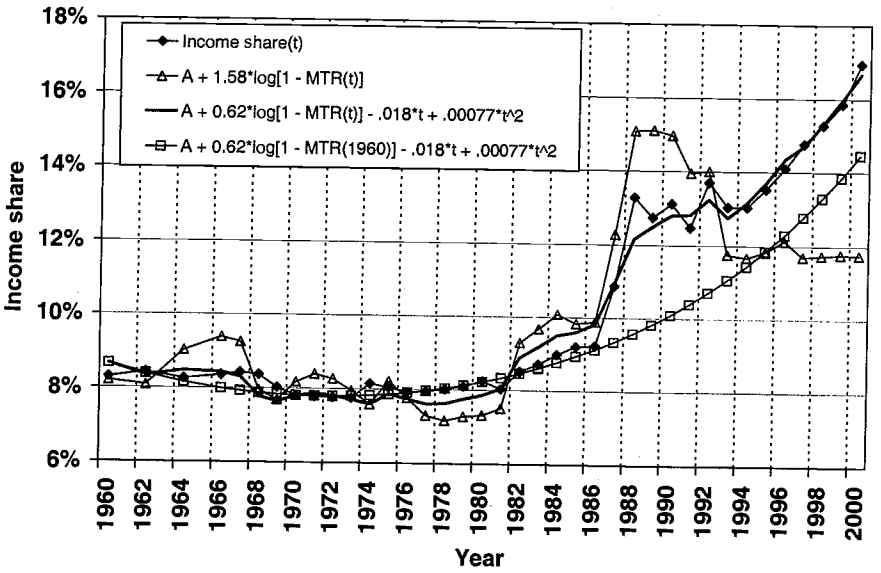

FIGURE 3. *The Top 1% Income Share and Fitted Values from Elasticity Regressions*

Source: Series based on regression analysis presented in Table 6, columns (1) and (5).

Notes: The diamond line is the top 1 percent income share. The line with triangles is the fitted regression curve, including only the net-of-tax rate. The solid line is the fitted regression curve, including time controls. The line with squares is the same fitted regression curve but the marginal tax rate is frozen at the 1960 value.

share from the 1960s to 2000 is due to the decline in marginal tax rates. Therefore, in summary, attributing all the increase in the top income shares to the tax developments generates large elasticities but fits the data poorly. Controlling for time trends fits the data much better and reduces substantially the elasticity as well as the fraction of the increase in top incomes that can be attributed to tax changes.

Figure 4 displays the share of income accruing to the bottom half of the top decile (panel A) and to the bottom half of the top percentile (panel B), along with the average marginal tax rate faced by these two groups. The figure shows that the top 10–5 percent income group has experienced moderate gains since 1960, and the pattern of the gains does not appear to be correlated with the pattern of the marginal tax rates that the group faces (rising up to 1981, then declining in the 1980s, then stable in the 1990s). Panels A and B in Table 7 show that regressing the log of the top income shares of the top 10–5 percent and top 5–1 percent on their log net-of-tax rates, with or without time trend controls, produces elasticities close to zero. Therefore, upper-middle-income families and individuals (up to the top 1 percent threshold, around $280,000 per year in 2000) do not appear to be sensitive to taxation.[38] It is striking, in particular, that these upper-middle-income taxpayer shares increase little during the 1980s; although they experience quite sizable marginal tax rate cuts (about 9 percentage points for the top 10–5 percent, and over 13 points for the top 5–1 percent).[39] Note again that IV estimates are also almost identical to OLS estimates.

Panel B of Figure 4 shows that the top 1–.5 percent share does not decrease during the 1970s, when the marginal tax rate increases from 40 to 50 percent, and does not increase during ERTA 1981, when the marginal tax rate decreases back to 40 percent. In contrast, TRA 1986, which decreases the rate to around 32 percent (thus a smaller percentage change in the net-of-tax rate relative to the 1970s or ERTA 1981), does produce a sizable increase in the income share, producing a noticeable break in the series. The increase in tax rates, to about 38 percent following OBRA 1992, does not seem to have affected the upward trend following TRA 1986. Thus, although marginal tax rates in the late 1990s are about the same as

[38] In principle, the secondary earner labor supply responses should be captured by those elasticities. Thus, my results can be consistent with the large married female labor supply responses obtained by Eissa (1995) only if secondary earners' income is a small fraction of total reported family incomes.

[39] A similar regression analysis for other income groups below the top decile generates small or even negative and always insignificant elasticities. The estimates are not precisely estimated, however, because changes in net-of-tax rates are much smaller below the top decile.

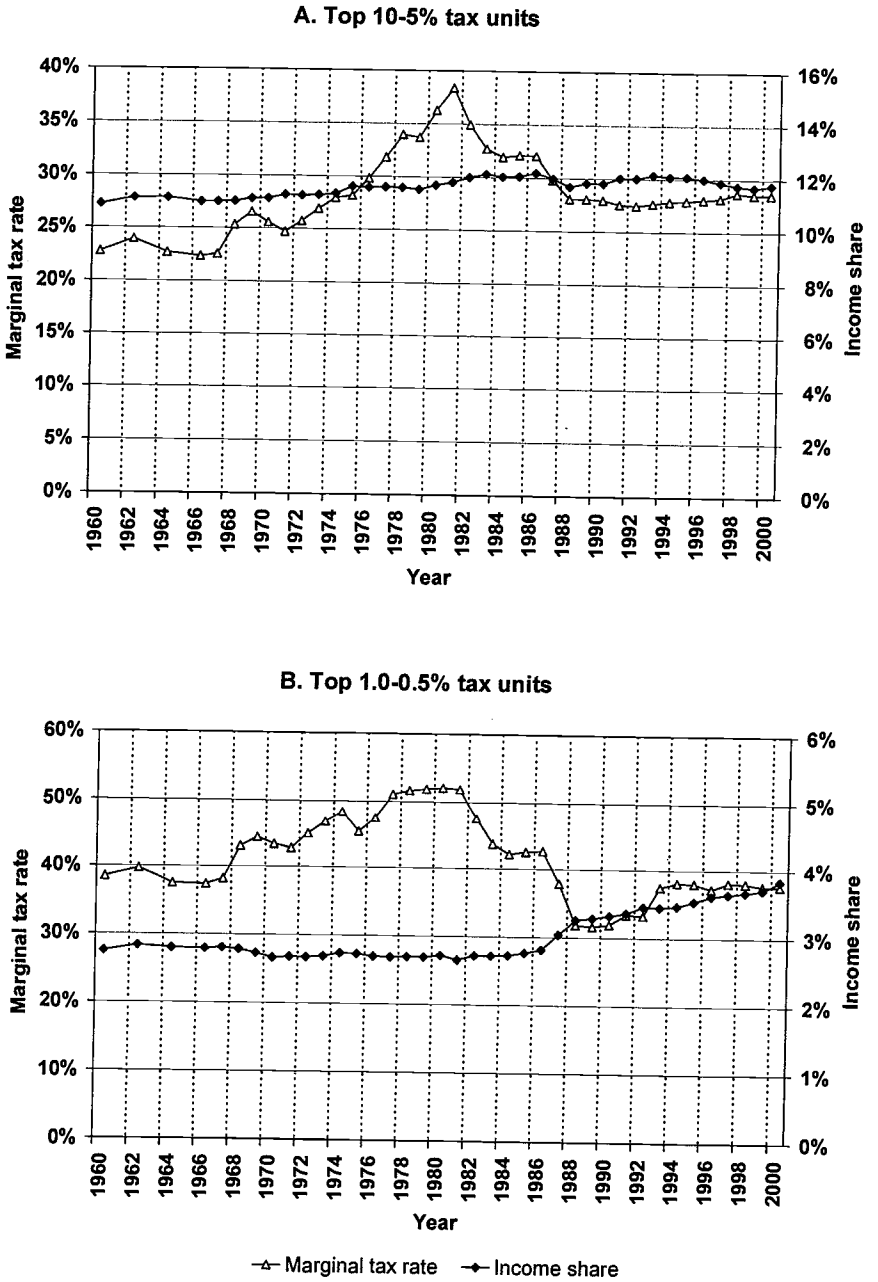

FIGURE 4. *Tax Rates and Income Shares for the Medium-High Income Groups*

Note: Based on Tables 4 and 5.

TABLE 7

Elasticities of income shares with respect to net-of-tax rates for various upper income groups

	Newey-West OLS regression, no time controls (1)	Newey-West OLS Regression, with time controls (2)	2SLS regression, with time controls (3)	Newey-West OLS Regression, no time controls (4)	Newey-West OLS regression, with time controls (5)	2SLS regression with time controls (6)
	A. Top income groups			*B. Intermediate income groups*		
	Top 10%			**Top 10–5%**		
Elasticity	0.77	0.33	0.32	–0.44	– 0.11	–0.04
	(0.36)	(0.08)	(0.05)	(0.17)	(0.09)	(0.10)
First-stage t-statistic of instrument			9.94			6.5
	Top 5%			**Top 5–1%**		
Elasticity	1.25	0.43	0.39	0.14	0.12	0.09
	(0.30)	(0.09)	(0.05)	(0.28)	(0.04)	(0.04)
First-stage t-statistic of instrument			10.5			8.16
	Top 1%			**Top 1–.5%**		
Elasticity	1.58	0.62	0.59	0.92	0.30	0.29
	(0.28)	(0.12)	(0.08)	(0.21)	(0.08)	(0.07)
First-stage t-statistic of instrument			10.11			10.65
	Top 0.5%			**Top 0.5–0.1%**		
Elasticity	1.55	0.72	0.69	1.21	0.52	0.49
	(0.25)	(0.13)	(0.09)	(0.22)	(0.09)	(0.08)

Continued

TABLE 7—*Continued*

	Newey-West OLS regression, no time controls (1)	Newey-West OLS Regression, with time controls (2)	2SLS regression, with time controls (3)	Newey-West OLS Regression, no time controls (4)	Newey-West OLS regression, with time controls (5)	2SLS regression with time controls (6)
	A. Top income groups			*B. Intermediate income groups*		
First-stage t-statistic of instrument			9.9			9.21
Elasticity						
	Top 0.1%			**Top 0.1–0.01%**		
	1.54	0.94	0.89	1.44	0.78	0.76
	(0.27)	(0.19)	(0.11)	(0.23)	(0.16)	(0.11)
First-stage t-statistic of instrument			11.37			9.69
Elasticity						
	Top 0.01%			**Top 0.01%**		
	1.45	1.08	1.09	1.45	1.08	1.09
	(0.36)	(0.32)	(0.16)	(0.36)	(0.32)	(0.16)
First-stage t-statistic of instrument			18.01			18.01

Notes: Estimates obtained by time-series regression of log(top income share) on a constant, log(1 – average marginal tax rate), time trend, and square of time trend from 1960 to 2000 (38 observations). In columns 1 and 4, OLS regression is run, no time trend included. Newey-West standard errors with 8 lags reported. In columns 2 and 5, OLS regression is run with time and time^2 trend included. Newey-West standard errors with 8 lags reported. In columns 3 and 6, 2SLS regression is run with time and time^2 trend included and instrumented with log (1 – top marginal tax rate).

in the 1960s, the income share is 30 percent larger.[40] The regressions for the top 1–.5 percent and top .5–.1 percent groups in Table 7 (panels C and D) display significant elasticities, but the size of the elasticity is much smaller when income controls are included.

Figure 5 displays the share of income and marginal tax rates for the very top groups: the top .1–.01 percent (panel A), and the top .01 percent (panel B). The responses to ERTA 1981 and TRA 1986 and the short-term response to OBRA 1993, followed by a surge in income shares since 1995, are even more pronounced than for the groups the top 0.1 percent below. However, the Kennedy tax cuts of the early 1960s provide striking new evidence. For the topmost .01 percent, the progressive tax structure of the early 1960s generated extremely high marginal tax rates (around 80 percent), which were reduced significantly by the Kennedy tax cuts in 1964–1965 (to about 65 percent).[41] This implies a 75 percent increase in the net-of-tax rate, a much larger increase than the ERTA 1981 and TRA 1986 tax rate reductions. In spite of this enormous marginal tax rate cut, the topmost income share remains flat in the 1960s and well into the 1970s, which suggests a complete absence of behavioral response in both the short- and the long-run.[42] Note that, although the top nominal marginal tax rate was 91 percent, the average marginal tax rate of the top .01 percent is only slightly above 80 percent. This is due to various other provisions of the tax code, such as the maximum average tax of 87 percent on income and charitable gifts by the wealthy.[43] Panels E and F of Table 7 show that the regressions for the top .1–.01 percent and the top .01 percent display significant elasticities in all specifications, although pure tax factors can explain only a fraction of the total increase in the top most shares once exogenous time trends are included.

[40] These considerations show again that elasticity estimates would be extremely sensitive to the time period considered. The ERTA 1981 and OBRA 1993 episodess would produce 0 elasticity estimates, and TRA 1986 would produce a sizable 0.93 estimate (comparing 1986 and 1988). Comparing 2000 to 1984 and attributing all the large increase in the share to the modest decrease in the marginal tax rate would produce an enormous elasticity estimate of 4.94.

[41] These tax cuts were proposed by President Kennedy in the early 1960s but were actually implemented by the Johnson administration after Kennedy's death in 1963.

[42] Lindsey (1990) claimed that the Kennedy tax cuts generated a surge in top incomes, but this erroneous result is due to his casual examination of the tabulations published by the IRS. Goolsbee (1999) makes a more careful use of the same published data (although he does not exclude realized capital gains and does not measure marginal tax rates accurately) and finds no response, as I do here.

[43] Considering smaller groups at the very top, such as the top .001 percent, never generates marginal tax rates higher than 80 to 82 percent.

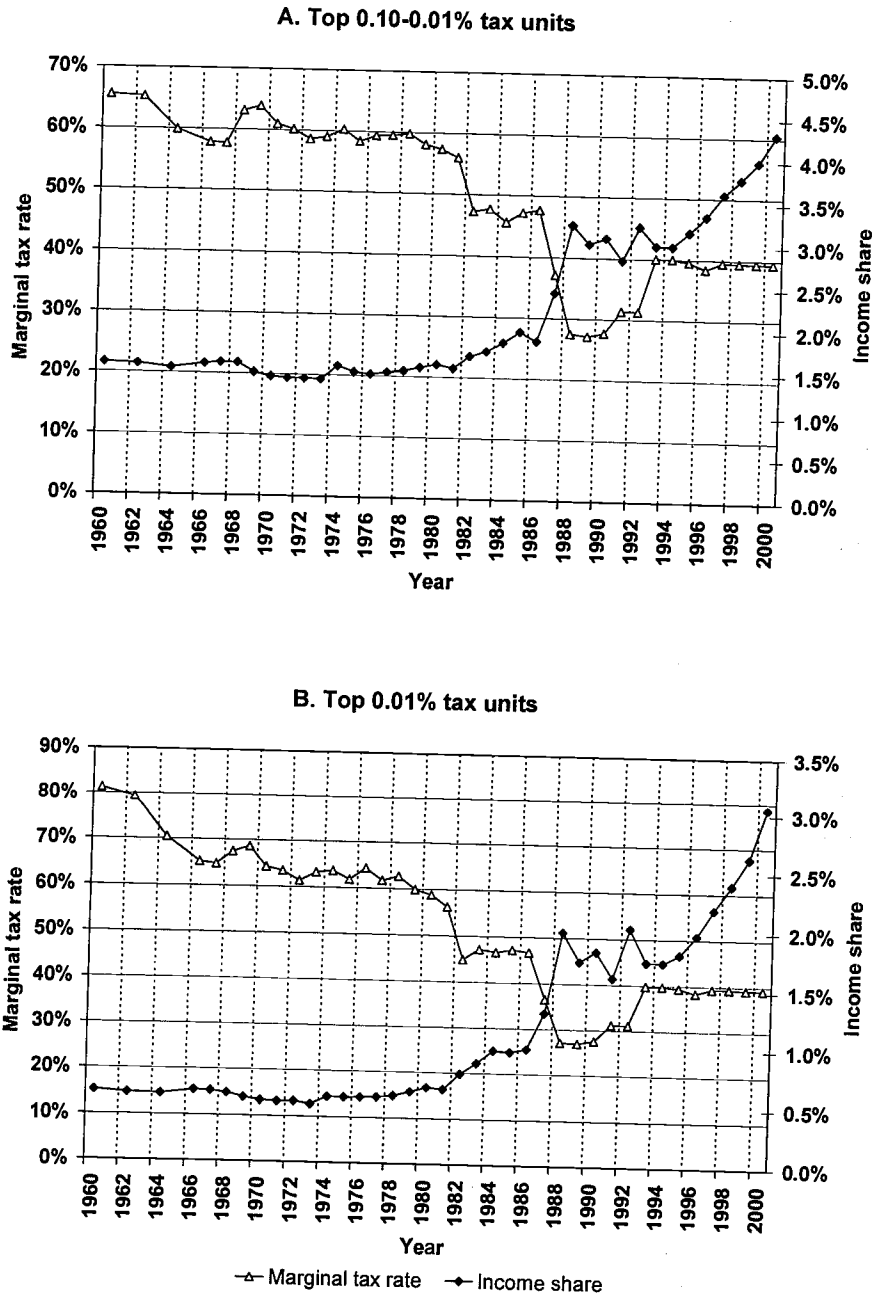

FIGURE 5. *Tax Rates and Income Shares for the Top Groups*

Note: Based on Series obtained from Tables 4 and 5.

3.3 Composition

In the previous subsection, we saw that the income groups within the top decile display very heterogeneous responses. Groups below the top 1 percent never display evidence of tax responsiveness. Top groups displayed a sharp response to the 1980s tax cuts, especially TRA 1986, but only a short-term response to the tax increase of 1993, and no response for the earlier tax cuts in the 1960s. To cast more light on these findings, I now turn to an analysis of the composition of those incomes.[44] The complete composition series of top income groups are reported in Tables D1 and D2 of Saez (2004), a longer version of my work.

Figure 6 displays the evolution of the top decile income share from 1960 to 2000 and how those incomes are decomposed into the seven sources

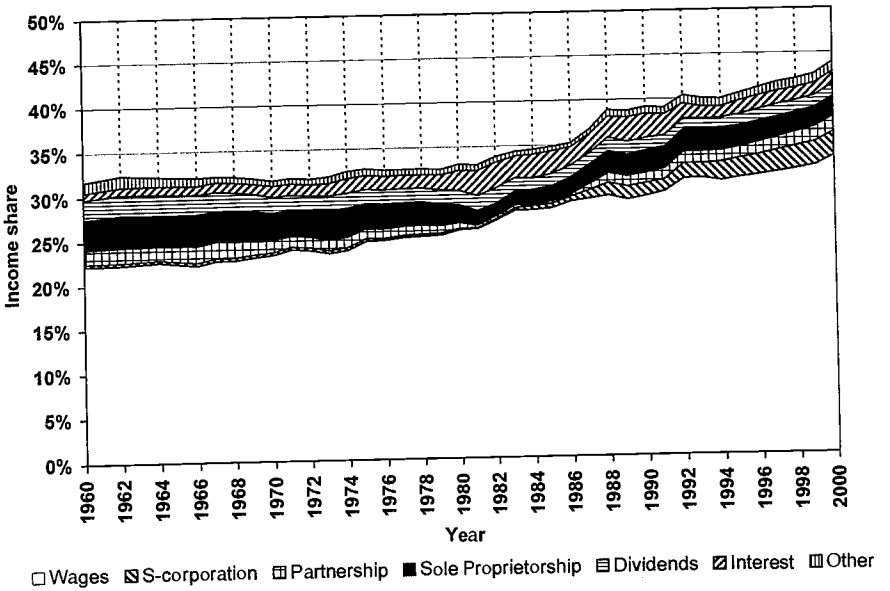

FIGURE 6. *The Top 10% Income Share and Composition, 1960–2000*

Source: Tables B1 and Table D1 in Saez (2004).

Notes: The figure displays the income share of the top 10 percent tax units and shows how the top 10 percent incomes are divided into seven income components: wages and salaries (including exercised stock options), S-corporation profits, partnership profits, sole proprietorship profits, dividends, interest income, and other income.

[44] Previous studies have focused mostly on taxable income elasticities. Feenberg and Poterba (1993, 2000) analyze the composition of incomes for the top .5 percent from 1951 to 1990, and Slemrod (1994, 1996) analyzes the composition of top incomes around TRA 1986.

described in section 2. Wage income forms the majority of the top 10 percent of incomes, and its share has increased smoothly from two-thirds to about three-quarters since 1960. The large 12-percentage-point gain in the top 10 percent income share (from 32 to 44 percent) is due almost entirely to a smooth and secular increase in the wage component (from 22 points to 33.5 points), with the size of the other components remaining stable overall (around 10 points, with a squeeze around 7 points in the late 1970s and early 1980s).

As depicted in Figure 7, the top 1 percent income share increases from 8.3 percent to almost 17 percent from 1960 to 2000. The striking feature, however, is that 7 out of the 8.7-point increase in the top 1 percent share is due to the wage-income component. As a result, although wages represented only 40 percent of total income for the top 1 percent in the early 1960s, they now represent over 60 percent of top 1 percent incomes. The increase in the wage component appears to have started in the early 1970s and has been fairly regular, with an acceleration in the last two decades

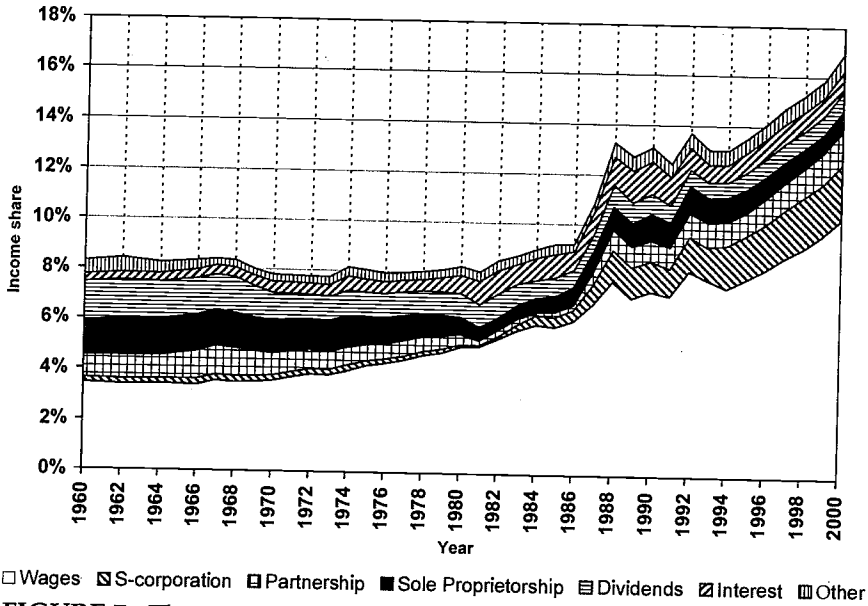

FIGURE 7. ***The Top 1% Income Share and Composition, 1960–2000***

Source: Tables B1 and Table D1 in Saez (2004).

Notes: The figure displays the income share of the top 1 percent tax units and shows how the top 1 percent incomes are divided into seven income components: wages and salaries (including exercised stock options), S-corporation profits, partnership profits, sole proprietorship profits, dividends, interest income, and other income.

(especially the 1990s). There are two spikes in the wage component series, one in 1988 (just after TRA 1986) and another in 1992 (just before the OBRA 1993 tax increase). However, the short-term nature of those two spikes suggests that they were the consequence of the retiming of wage income to take advantage of lower rates.[45]

Although the nonwage part stays stable as a whole, the components display interesting patterns. The most striking feature is the emergence of S-corporation income after TRA 1986. Before the 1980s, S-corporation income was extremely small. Indeed, the standard C-corporation form was more advantageous for high-income individual owners because the top individual tax rate was much higher than the corporate tax rate and taxes on capital gains were relatively low. S-corporation income increases sharply from 1986 to 1988 and increases slowly afterward. The sharp increase in S-corporation income just after TRA 1986 certainly reflects in large part a shift in the status from C-corporation to S-corporation status to take advantage of the lower individual rates.[46] In contrast, dividends (paid out by C-corporations and foreign corporations) and sole proprietorship income decreased regularly over the period. Partnership income is about the same in the 1960s as in the 1990s; partnership income was very small during the 1980s due to a dramatic increase in partnership losses.[47] The dramatic increase of partnership losses from the mid- to late 1970s up to 1986 (during recessions and recoveries alike) is probably due first to the increase in inflation, which might have increased losses because of the deductibility of nominal interest payments.[48] Then taxpayers and tax accountants might have realized that partnerships offered an attractive possibility for avoiding taxes. The repeal of the investment tax credit and the passive losses limitations with the TRA 1986, as well as the reduction in top tax rates, have drastically reduced the value of those tax shelters and probably explains the quick and sustained disappearance of most partnership losses just after TRA 1986.[49] Sole proprietorship income also displays a similar pattern, with a sharp reduction from the mid-1970s

[45] Goolsbee (2000b) showed that many executives exercised their stock options in 1992 to take advantage of the low rate of 31 percent in 1992 before the increase to 39.6 percent in 1993. This retiming explains the large difference between the short-term and long-term elasticity estimates using the OBRA 1993 reform.

[46] See Slemrod (1996), Carroll and Joulfaian (1997), and Gordon and Slemrod (2000) for a more precise analysis.

[47] Partnership profits have stayed about stable over the full period.

[48] Note that interest income (which is not net of interest payment deductions) is also particularly high during that period.

[49] See Samwick (1996) for a more detailed analysis.

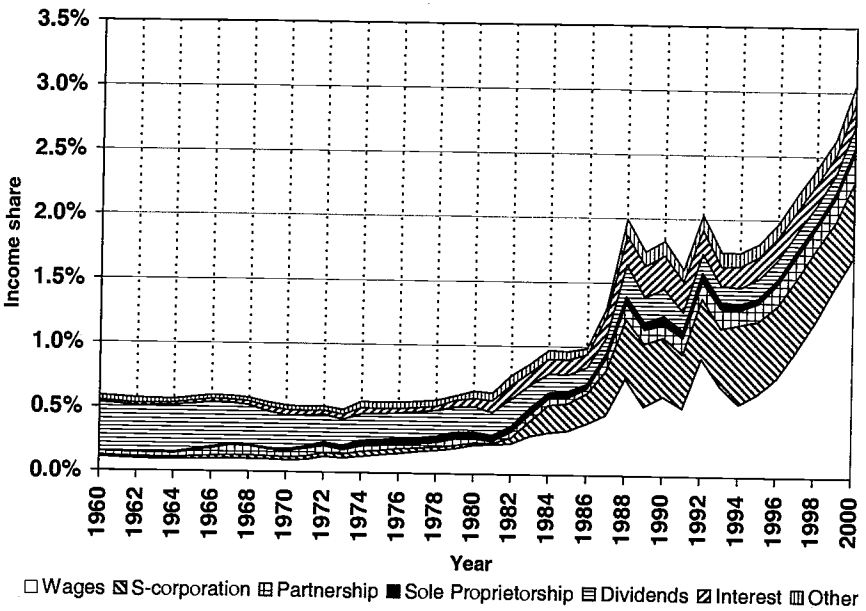

FIGURE 8. ***The Top 0.01% Income Share and Composition, 1960–2000***

Source: Tables B1 and Table D1 in Saez (2004).

Notes: The figure displays the income share of the top .01 percent tax units and shows how the top .01 percent incomes are divided into seven income components: wages and salaries (including exercised stock options), S-corporation profits, partnership profits, sole proprietorship profits, dividends, interest income, and other income.

to the mid-1980s.[50] Although the wage income component starts to increase in the early 1970s, the combined effect of sharp reductions in partnership and sole proprietorship incomes from the mid-1970s to 1981 explains why the top 1 percent income share stays almost flat up to 1981.

Figure 8 displays the income share and composition of the top .01 percent group. It shows a dramatic shift in the composition of the topmost incomes away from dividends (which represented more than 60 percent of top incomes in the early 1960s) toward wage income (which represents about 60 percent of top incomes in 2000).[51] In the early 1960s, the top .01 percent incomes were facing extremely high marginal tax rates of about

[50] Sole proprietorship income displays a secular trend downward from 1960 to 2000 most likely because of the secular decline in farming and other traditional small-business activities organized in the form of sole proprietorships.

[51] This secular shift from rentiers to the working rich at the top of the U.S. income distribution is described in more detail in Piketty and Saez (2003).

80 percent on average (while tax rates on long-term capital gains were around 25 percent). Thus, dividends were a disadvantageous form of income for the rich, which suggests that these top-income earners had little control over the form of payment and thus might have been passive investors. The Kennedy tax cuts did not reduce the top individual rate enough (the top rate became 70 percent) to make the S-corporation form attractive relative to the C-corporation form, which explains perhaps the contrast in behavioral responses between the Kennedy tax cuts and the tax changes of the 1980s. This situation shows, as argued by Slemrod and Kopczuk (2002), that the elasticity of reported incomes is not a constant parameter but may be extremely sensitive to the legal structure and the complete tax environment for corporations and individuals. The share of dividends falls regularly over the period, while the share of wage income starts to increase in 1971. By 1979, the wage component overtakes the dividend component. Figure 8 shows clearly that ERTA 1981 produced a sudden burst of S-corporation income (which was negligible up to 1981) mostly likely because of a shift from C-corporations to S-corporations.[52] Note that the increase in S-corporation income is concentrated mostly in the top .01 percent and does not happen at all for groups below the top .1 percent. This situation is consistent with the tax minimization explanation: ERTA 1981 decreased marginal tax rates significantly only for groups above the top .1 percent, for whom the Subchapter S status started to become attractive when the top individual rate was reduced to 50 percent.[53] Figure 8 shows that almost all the increase in top incomes from 1981 to 1984, first documented by Lindsey (1987), is also due to the surge in S-corporation income. The wage component increases as well but with no noticeable break in the upward trend around ERTA 1981.[54] The S-corporation component increases again sharply from 1986 to 1988 and then stays about stable afterward. The wage component also presents a spike in 1988 and in 1993, but these spikes seem to be short-term responses in a generally upward trending curve. The tax cuts of the 1960s, although extremely large, did not generate any behavioral response perhaps because top individual rates remained substantially higher than the corporate and capital gains tax rate and thus did not induce top-income taxpayers to switch corporate income toward individual income.

[52] As discussed in section 2.1, this phenomenon has been well documented in the case of TRA 1986.

[53] From 1980 to 1986, the corporate tax rate was 42 percent.

[54] Because of the maximum tax of 50 percent on labor income enacted in 1971–1972, the marginal tax rates for top wage incomes actually did not change much with ERTA; see section 3.4.

Therefore, to sum up, the dramatic increase in top income shares is due primarily to a secular increase in the wage income component starting in the early 1970s, and the large tax changes of TRA 1986 and OBRA 1993 seem to have generated only short-term spikes in the overall upward and accelerating trend of the wage component.[55] The tax cuts of the 1980s have generated a surge in business income taxed at the individual level. ERTA 1981 created a surge in S-corporation income for the topmost groups of the income distribution. With TRA 1986, S-corporation income surged for all upper-income groups. Partnership income also rose dramatically immediately after TRA 1986 mostly because of the disappearance of partnership losses. These business income components have remained relatively stable after TRA 1986, which suggests they were the consequence of a one-time shift from the corporate sector and the one-time closing of the partnership loss tax shelters. The top tax rate increase of 1993 to 39.6 percent (with a corporate tax rate of 35 percent) was not large enough to induce businessowners to switch back to the C-corporation status. As a result, OBRA 1993 did not produce any long-term income shifting away from the individual sector, and its only effect seems to have been a short-term retiming of salary income. The surge in business income reported on individual returns in the 1980s cannot be interpreted as a supply-side success because most of these individual income gains came either at the expense of taxable corporate income or could have been obtained from the closing of tax shelters after the imposition of stricter rules on losses from passive businesses.[56] Therefore, the success or failure of the tax cuts at generating additional economic activity must be deferred to a more precise analysis of the central wage income component, to which we now turn.

3.4 *Top Wage Incomes*

We have seen that most of the increase in top income shares since the 1970s is actually due to a sharp increase in the wage income component. The time pattern of marginal tax rates for wage income is not the same as the pattern for other forms of income because of the introduction of the maximum tax rate on earned income in 1971, which reduced the top rate

[55] Top income shares are flat before 1981, masking the increase in the wage component, because of a large decline in partnership and sole proprietorship income, due in turn perhaps to high interest rates and the development of tax shelters in the 1970s. Partnership income and, to a lesser extent, sole proprietorship income increased back to their early 1970s levels immediately after TRA 1986.

[56] It is doubtful that the decrease in tax rates, by reducing the incentives to avoid taxes, was necessary to eliminate abusive partnership losses (as argued, for example, in Samwick, 1996) because partnership losses were almost nonexistent before the late 1970s, a time when tax rates were extremely high.

for earned income from 70 percent (the top rate on other income) to 60 percent in 1971 and then 50 percent starting in 1972.[57] This provision became irrelevant in 1982, when the top tax rate for any income source was reduced from 70 percent to 50 percent. Therefore, analyzing the wage income component separately is of particular interest. All the top wage income share series and corresponding average marginal tax rates for wage income are reported in Tables 8 and 9, respectively.

As for average income, the evolution of average real wage income series (for the full population) does not appear to be correlated with the evolution of marginal tax rates. Figure 9 shows the pattern of real incomes and marginal tax rates for the bottom 99 percent wage earners (panel A) and the top 1 percent wage earners (panel B). The bottom 99 percent have experienced no real growth in wage income since 1972, and the pattern of changes in real wages does not seem to be related to changes in marginal tax rates. In contrast, top 1 percent wage income earners experienced accelerating growth over the 1960 to 2000 period, with almost a tripling in real wage income since the early 1970s. Consistent with the pattern of the wage component for overall income, top wage income earners experienced spikes just after TRA 1986 and just before OBRA 1993, clear evidence of short-term responses (or retiming) of labor income compensation. However, the long-run pattern seems to be an extraordinary and accelerating growth independent of the tax developments because marginal tax rates on these wage income earners were about the same, around 40 percent, in the mid-1960s and in the most recent years. Indeed, the secular growth in top wages starts in the early 1970s, a time when marginal tax rates were actually increasing (due mostly to the progressive nature of the income tax structure and the resulting bracket creep). To understand better this unprecedented increase in top wage incomes, it is useful to consider smaller groups within the top 1 percent, as I did for overall income.

Table 10 produces the same regressions as Table 7 but for wage incomes instead of overall income.[58] The shares of the bottom groups of the top decile below the top 1 percent (top 10–5 percent and top 5–1 percent) display low elasticities, while all groups within the top 1 percent display significant elasticities when no time trend is included. The elasticities increase sharply from 0.3 to 2.5 as we move up the wage income distribution

[57] As described in Slemrod (1994), the marginal income tax rate on labor income could be higher than these limits in several cases because of the interaction of this provision with the regular schedule.

[58] I have omitted the IV estimates in the case of wages because the first stage is not as strong as in the case of income and because the estimates are more noisy.

TABLE 8
Top Wage Income Shares in the United States, 1960–2000

Year	Top 10% (1)	Top 5% (2)	Top 1% (3)	Top .5% (4)	Top .1% (5)	Top .01% (6)	Top 10–5% (7)	Top 5–1% (8)	Top 1–.5% (9)	Top .5–.1% (10)	Top .1–.01% (11)	Top .01% (12)
1960	24.64	15.11	5.16	3.30	1.15	0.25	9.53	9.95	1.86	2.15	0.91	0.25
1962	24.62	15.02	5.05	3.21	1.08	0.21	9.60	9.97	1.85	2.13	0.87	0.21
1964	24.98	15.25	5.12	3.24	1.07	0.21	9.73	10.13	1.88	2.17	0.87	0.21
1966	25.35	15.47	5.16	3.27	1.10	0.22	9.88	10.31	1.89	2.16	0.88	0.22
1967	25.78	15.81	5.34	3.38	1.14	0.23	9.97	10.47	1.96	2.24	0.91	0.23
1968	25.60	15.66	5.24	3.32	1.12	0.23	9.94	10.42	1.92	2.20	0.89	0.23
1969	25.71	15.68	5.19	3.27	1.10	0.24	10.04	10.49	1.92	2.17	0.87	0.24
1970	25.67	15.64	5.13	3.21	1.06	0.21	10.03	10.51	1.92	2.15	0.85	0.21
1971	25.67	15.67	5.18	3.25	1.08	0.22	10.00	10.49	1.93	2.17	0.86	0.22
1972	25.82	15.80	5.32	3.39	1.14	0.24	10.02	10.48	1.94	2.24	0.90	0.24
1973	26.15	16.06	5.43	3.43	1.14	0.24	10.09	10.63	2.00	2.28	0.91	0.24
1974	26.63	16.48	5.66	3.63	1.26	0.27	10.15	10.82	2.03	2.37	0.99	0.27
1975	26.46	16.32	5.64	3.63	1.26	0.27	10.15	10.67	2.01	2.38	0.98	0.27
1976	26.66	16.49	5.74	3.70	1.30	0.29	10.16	10.76	2.04	2.40	1.02	0.29
1977	26.94	16.70	5.85	3.79	1.35	0.30	10.25	10.85	2.06	2.45	1.05	0.30
1978	27.43	17.07	6.05	3.93	1.40	0.31	10.36	11.02	2.13	2.53	1.09	0.31
1979	27.65	17.25	6.21	4.06	1.47	0.34	10.40	11.03	2.15	2.59	1.13	0.34
1980	28.06	17.60	6.43	4.23	1.57	0.38	10.46	11.17	2.20	2.66	1.19	0.38

1981	28.15	17.65	6.43	4.24	1.59	0.39	10.50	11.23	2.18	2.66	1.20	0.39
1982	28.56	18.02	6.68	4.42	1.67	0.41	10.54	11.34	2.25	2.75	1.26	0.41
1983	29.09	18.49	6.96	4.66	1.80	0.47	10.61	11.53	2.30	2.86	1.33	0.47
1984	29.61	18.95	7.27	4.96	1.99	0.52	10.66	11.68	2.32	2.97	1.47	0.52
1985	29.74	19.05	7.28	4.92	1.98	0.54	10.70	11.77	2.35	2.95	1.44	0.54
1986	29.94	19.19	7.33	4.96	2.02	0.58	10.75	11.87	2.36	2.95	1.44	0.58
1987	30.60	19.99	8.15	5.69	2.43	0.69	10.61	11.83	2.47	3.25	1.74	0.69
1988	31.97	21.37	9.38	6.79	3.16	1.09	10.60	11.99	2.59	3.63	2.07	1.09
1989	31.55	20.83	8.70	6.13	2.69	0.82	10.71	12.14	2.57	3.44	1.86	0.82
1990	31.81	21.14	9.00	6.41	2.87	0.91	10.67	12.14	2.59	3.54	1.96	0.91
1991	31.44	20.77	8.56	5.97	2.57	0.78	10.67	12.21	2.59	3.40	1.79	0.78
1992	32.46	21.85	9.63	6.97	3.33	1.22	10.61	12.22	2.66	3.64	2.12	1.22
1993	31.85	21.29	9.06	6.41	2.90	0.96	10.56	12.23	2.64	3.51	1.95	0.96
1994	31.54	20.95	8.72	6.07	2.63	0.83	10.59	12.22	2.65	3.44	1.80	0.83
1995	32.43	21.73	9.26	6.52	2.91	0.94	10.70	12.48	2.73	3.62	1.97	0.94
1996	33.16	22.47	9.80	6.97	3.21	1.11	10.69	12.66	2.83	3.77	2.10	1.11
1997	33.88	23.19	10.43	7.54	3.67	1.36	10.70	12.75	2.89	3.88	2.31	1.36
1998	34.34	23.73	10.98	8.08	4.12	1.65	10.61	12.76	2.89	3.96	2.48	1.65
1999	35.11	24.50	11.64	8.71	4.67	1.98	10.61	12.85	2.94	4.04	2.69	1.98
2000	36.03	25.42	12.61	9.64	5.44	2.45	10.62	12.84	2.99	4.24	3.03	2.45

Notes: Computations by authors on tax return statistics. Taxpayers are ranked by wages and salaries (which includes exercise of stock options). Groups are defined relative to all tax units with wage income (filers and nonfilers).

The table reports the percentage of total wages and salaries accruing to each of the top groups. Top 10 percent denotes to top decile, top 10–5 percent denotes the bottom half of the top decile, etc.

TABLE 9

Marginal Tax Rates (MTR) on Wages for Top Wage Income Groups in the United States, 1960–2000

Year	Top 10% (1)	Top 5% (2)	Top 1% (3)	Top .5% (4)	Top .1% (5)	Top .01% (6)	Top 10–5% (7)	Top 5–1% (8)	Top 1–.5% (9)	Top .5–.1% (10)	Top .1–.01% (11)	Top MTR (12)
1960	28.48	32.11	43.20	48.83	60.05	67.48	22.73	26.36	33.18	42.83	58.02	87
1962	29.44	33.06	44.39	50.08	61.05	71.97	23.78	27.31	34.53	44.53	58.41	87
1964	27.67	30.95	40.91	45.51	54.86	62.81	22.52	25.91	33.01	40.88	52.97	77
1966	26.96	30.06	39.99	45.02	53.91	60.45	22.10	25.09	31.28	40.49	52.26	70
1967	27.54	30.83	40.93	45.61	54.10	60.52	22.31	25.69	32.86	41.31	52.46	70
1968	30.68	34.27	45.35	50.15	58.22	63.79	25.01	28.70	37.08	46.02	56.79	75.25
1969	31.93	35.58	46.27	50.90	57.96	60.48	26.23	30.29	38.38	47.31	57.27	77
1970	30.96	34.57	45.36	49.72	56.25	60.53	25.32	29.32	38.07	46.51	55.20	71.75
1971	30.61	34.40	45.08	49.09	55.05	57.32	24.68	29.11	38.35	46.13	54.48	60
1972	31.48	35.24	45.08	48.05	50.27	50.52	25.56	30.24	39.89	46.92	50.21	50
1973	32.78	36.70	46.01	48.43	50.04	49.97	26.55	31.95	41.86	47.63	50.06	50
1974	34.10	38.19	47.05	49.22	49.94	49.66	27.45	33.55	43.17	48.84	50.02	50
1975	34.30	37.99	46.01	48.14	49.63	49.61	28.38	33.75	42.17	47.35	49.64	50
1976	36.04	39.76	47.27	48.94	49.30	48.10	30.01	35.76	44.24	48.74	49.64	50
1977	38.44	42.50	49.58	50.46	50.13	48.84	31.84	38.68	47.94	50.65	50.50	50
1978	40.06	43.93	49.95	50.37	50.19	49.02	33.67	40.63	49.18	50.47	50.52	50
1979	40.21	44.19	49.92	50.31	49.10	47.63	33.62	40.97	49.17	50.99	49.55	50
1980	41.90	45.38	49.57	49.69	48.28	47.06	36.05	42.97	49.34	50.53	48.67	50

1981	42.87	45.69	48.67	48.49	47.07	46.53	38.12	43.99	49.01	49.34	47.24	50
1982	39.14	41.61	44.64	44.70	44.12	43.13	34.93	39.83	44.52	45.05	44.44	50
1983	37.00	39.35	43.14	44.25	45.15	45.33	32.91	37.06	40.89	43.69	45.08	50
1984	35.94	38.24	41.91	42.95	42.83	44.71	31.84	35.96	39.69	43.03	42.16	50
1985	36.24	38.62	42.54	43.51	44.80	44.54	32.01	36.19	40.52	42.65	44.90	50
1986	36.47	38.95	43.20	44.10	44.71	44.37	32.05	36.32	41.30	43.69	44.84	50
1987	33.32	35.19	37.01	36.82	36.67	36.91	29.79	33.93	37.45	36.93	36.58	38.5
1988	28.79	29.28	28.91	27.73	27.10	26.61	27.81	29.56	32.00	28.29	27.36	28
1989	28.89	29.46	29.09	27.92	27.25	27.33	27.78	29.72	31.89	28.45	27.22	28
1990	28.97	29.61	29.42	28.32	27.73	27.76	27.71	29.75	32.15	28.79	27.71	28
1991	29.57	30.62	32.06	31.71	31.35	31.26	27.52	29.60	32.89	31.98	31.39	31
1992	29.64	30.66	31.88	31.51	31.35	31.24	27.55	29.69	32.85	31.65	31.42	31
1993	31.78	33.79	38.59	39.46	40.03	39.81	27.74	30.23	36.48	38.99	40.14	39.6
1994	31.83	33.84	38.83	39.60	40.10	40.09	27.85	30.28	37.07	39.22	40.11	39.6
1995	31.96	33.96	38.52	39.04	39.74	39.88	27.91	30.57	37.29	38.48	39.67	39.6
1996	31.75	33.57	37.68	37.98	38.80	39.01	27.92	30.39	36.92	37.28	38.69	39.6
1997	32.51	34.56	39.00	39.51	39.71	39.75	28.08	30.93	37.68	39.32	39.68	39.6
1998	32.95	34.91	39.02	39.43	39.64	39.60	28.56	31.37	37.90	39.21	39.66	39.6
1999	33.13	35.14	38.83	39.33	39.48	39.37	28.50	31.80	37.33	39.17	39.56	39.6
2000	33.31	35.37	38.64	39.23	39.32	39.14	28.44	32.24	36.77	39.13	39.46	39.6

Notes: Marginal tax rates on wage income are computed using microfiles of tax returns and the TAXSIM calculator. Marginal tax rates include only federal income taxes and ignore state income taxes, as well as payroll taxes. Marginal tax rates are weighted by wage income.

Column (12) reports the top marginal tax rate on labor income. In 1960–1963, the top bracket rate is 91 percent, but there is maximum average tax rate of 87 percent. In 1971–1981, the top marginal tax rate for nonlabor income is 70 percent (see Table 8), and the labor income marginal tax rate can be locally larger than reported.

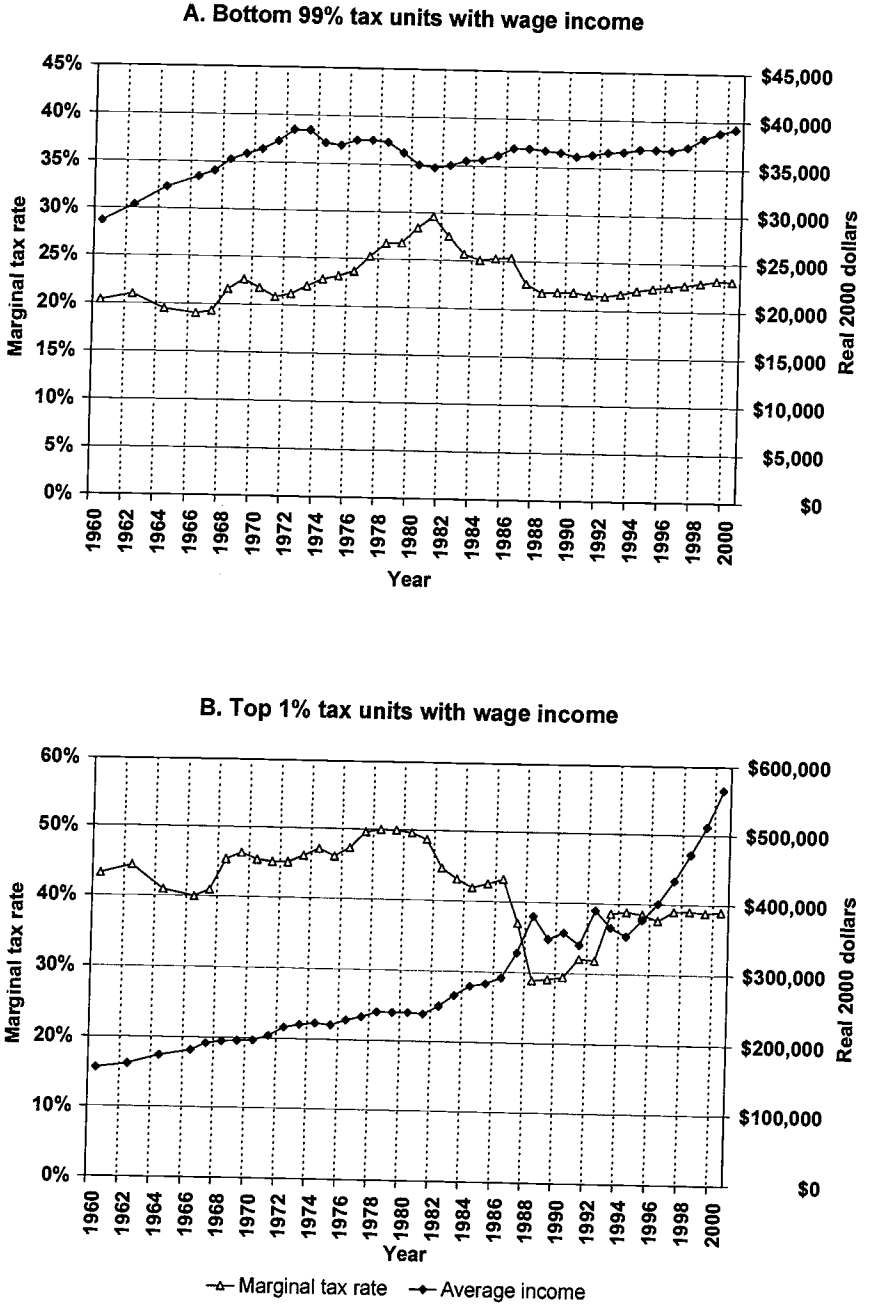

FIGURE 9. *Marginal Tax Rates and Average Real Wage Incomes for the Bottom 99% and the Top 1%*

Source: Based on Series obtained from Tables 1, 8, and 9.

TABLE 10

Elasticities of wage income shares with respect to net-of-tax rates for various upper wage income groups

	Newey-West OLS regression, no time controls (1)	Newey-West OLS regression, with time controls (2)	Newey-West OLS regression, no time controls (3)	Newey-West OLS regression, with time controls (4)
	A. Top wage income groups		*B. Intermediate groups*	
	Top 10%		**Top 10–5%**	
Elasticity	–0.10	0.10	–0.43	–0.05
	(0.55)	(0.07)	(0.18)	(0.02)
	Top 5%		**Top 5–1%**	
Elasticity	0.41	0.17	–0.17	0.07
	(0.56)	(0.09)	(0.37)	(0.02)
	Top 1%		**Top 1–.5%**	
Elasticity	1.97	0.39	0.31	0.15
	(0.45)	(0.12)	(0.48)	(0.05)
	Top 0.5%		**Top 0.5–0.1%**	
Elasticity	2.33	0.51	1.50	0.38
	(0.54)	(0.13)	(0.32)	(0.08)
	Top 0.1%		**Top 0.1–0.01%**	
Elasticity	2.44	0.82	2.16	0.72
	(0.43)	(0.17)	(0.37)	(0.11)
	Top 0.01%		**Top 0.01%**	
Elasticity	2.48	0.96	2.48	0.96
	(0.50)	(0.42)	(0.50)	(0.42)

Notes: Estimates obtained by time-series regression of log (top wage income share) on a constant, log (1 – average marginal tax rate), time trend, and square of time trend from 1960 to 2000 (38 observations). In columns 1 and 3, OLS regression is run, no time trends included. Newey-West standard errors with 8 lags reported. In columns 2 and 4, OLS regression is run with time and time ^2 trend included. Newey-West standard errors with 8 lags reported.

because all the increase in the top wage income shares is attributed to the secular decline in marginal tax rates since the 1960s. Including two time trends reduces significantly the estimated elasticities, which are below 0.4 except for the topmost groups. Even within the top 0.1 percent group, where elasticities are sizable, tax changes can explain only a small fraction of the dramatic surge in top wage incomes.

They key point to resolve is whether we should attribute the long-term increase in top wage shares entirely to the long-term decrease in marginal tax rates. Comparing 1960 and 2000, that view seems to be untenable for groups below the top .1 percent because these groups faced comparable marginal tax rates in 1960 and in 2000. As a result, the sizable increase in

the top 1–.5 percent and top .5–.1 percent wage income shares cannot be due entirely to marginal tax rates.

The problem is more complicated for the topmost groups (within the top .1 percent) because these groups experienced much larger gains but also experienced a nontrivial decline in marginal tax rates. Undoubtedly, a reason for the huge increase in top wage income shares (the top .01 percent share increased more than tenfold, from .21 percent in 1970 to 2.45 percent in 2000) has been the development of stock options. Stock options also create lumpiness in wage compensation because they are exercised by executives only once every few years. As a result, the top .01 percent might be extremely large in recent years because, in any given year, topmost wage earners are executives who happen to exercise their stock options in that particular year. The stock-option phenomenon, however, has clearly increased the average compensation of top executives because the top 1 percent (which certainly includes almost all the top employees receiving large option grants, even when they do not exercise stock options) more than doubles from 5.1 to 12.6 percent from 1970 to 2000.

Thus, the extraordinary increase in top wage incomes, a phenomenon certainly closely related to the explosion in the compensation of chief executive officers (CEOs) and other top executives and sports, movie, and television stars, appears too large to have been solely the direct consequence of the tax reductions through supply-side effects. Furthermore, the surge in top wages is not related closely enough to the timing of the tax cuts to suggest a direct and simple causal link. Particularly surprising is the surge in top wages since 1994, in spite of the significant tax increase in 1993, which makes the secular reduction in marginal tax rates faced by top wage groups appear rather small.[59]

A more pertinent issue is whether this surge in top wages could have occurred had the tax structure remained the same as in the early 1960s, when the working rich had to pay in taxes more than three-quarters of their compensation. It is plausible to think that the drastic reduction in top marginal tax rates, which started in the 1960s, opened the possibility of the dramatic increase in top wages that started in the 1970s and accelerated in the 1980s and 1990s. Of course, it is impossible to provide a convincing answer to that important issue by looking only at individual income tax statistics in the United States. A promising approach would be to analyze executive compensation data. Many have researched executive

[59] Companies might have started granting stock options more aggressively after TRA 1986, however, because of the decrease in individual tax rates. These options can be exercised (and thus appear on individual income tax returns) only several years later. However, Hall and Murphy (2003) show that grants of stock options, valued using the Black-Scholes formula, increased significantly *after* the tax increase of 1993.

compensation; see Murphy (1999) for a survey. Although many studies explain the disparity of CEO pay in cross-sectional data, no convincing explanation for the time-series evidence seems to have been provided.[60] If the dramatic surge in top compensation is not fully explained by a comparable surge in the marginal productivity of top executives, then this lack is evidence of a market failure, which would certainly change the welfare and tax policy analysis that I presented above. Perhaps top executive pay may now be aligned with marginal product and was below market value before. Note, however, that the surge in the top 1 percent salaries since the early 1970s has been accompanied by dismal growth for the bottom 99 percent salary earners and thus does not seem to have had a positive impact on the vast majority of working families. An alternative way to make progress in our understanding is by looking at comparable experiences in other countries, a point to which I now turn for the conclusion.

4. CONCLUSION: INTERNATIONAL COMPARISONS

No other country offers such a large body of empirical analysis on behavioral responses to individual income taxation as does the United States. Recently, however, several studies have produced series of top income shares using tax return data. Although these studies do not produce corresponding series of marginal tax rates, as I have shown here, interesting findings emerge.

First, enormous heterogeneity exists in the behavior of top income shares in recent decades across countries. Some countries, such as the United Kingdom (Atkinson, 2002) or Canada (Saez and Veall, 2003) have experienced notable increases in top income shares, although these increases have not been as pronounced as in the United States. In contrast, countries from continental Europe, such as France (Piketty, 2003), the Netherlands (Atkinson and Salverda, 2003), and Switzerland (Dell, Piketty, and Saez, 2003), have experienced either decline or little change in top income shares since 1960.

Second, the U.K. experience seems to be the closest to the U.S. experience. Top income shares in the United Kingdom started increasing exactly in 1979, when the top rate declined from 98 to 75 percent, although the concomitant increase seems modest relative to the size of the net-of-tax

[60] It is quite telling to read in the recent survey of Hall and Murphy (2003), two prominent and conservative researchers in this field, that their best explanation for the surge in stock-option compensation was that "boards and managers falsely perceive stock options to be inexpensive because of accounting and cash-flow considerations."

increase at the top.[61] In 1988, the top rate was further decreased to 40 percent and has not changed since then. In contrast to the United States, however, the increase in top share has been relatively smooth since 1979, with no break around the tax changes. Studying the composition and estimating precisely the marginal tax rates faced by top U.K. income-taxpayers seems to be a priority in understanding whether the recent increase in top incomes is due to the tax developments.[62]

Third, Canada has experienced a surge in top incomes significantly larger than the increase in the United Kingdom (although smaller than that in the United States) and, as in the United States, this increase has been due to a dramatic increase in top salaries since the early 1980s. In contrast to the United States, however, top incomes in Canada have not experienced, large tax cuts since the 1960s.[63] Thus, the dramatic increase in top incomes in Canada cannot be attributed solely to fiscal developments in Canada. Saez and Veall (2003) argue that the threat of emigration to the United States has forced Canadian companies to increase the pay of their top employees if they want to retain them, thereby replicating in Canada the dramatic U.S. increase in top employees' pay. If the migration explanation is correct, it implies that the surge in top wage incomes in the United States is a real phenomenon and not a unique consequence of the repackaging of income to avoid taxes.

Last, France, the Netherlands, and Switzerland have experienced relatively small changes in their top tax rates, in contrast to the United States and the United Kingdom. Piketty (1999) shows that the small changes in the French top tax rates generated small shortterm responses from top income taxpayers but that those responses do not seem to persist over time. Switzerland has lower top-income tax rates than does the United States (around 35 percent when adding federal, cantonal, and local income taxes), but has much lower top income shares than does the United States (the top 1 percent share was around 8–9 percent in the 1990s, while it was between 13 and 17 percent in the United States).

In sum, high income tax rates do not seem to account for the differences in top income shares across countries, although it is more debatable whether they can account for a substantial part of the time-series pattern within countries. Therefore, a systematic analysis of top incomes in countries

[61] It might be the case, however, that for the top .1 percent incomes, the average decline in marginal tax rates has been much more modest.

[62] Dilnot and Kell (1988) try to analyze this issue but have access only to a single year of micro tax returns and have to rely on aggregate numbers for their time-series analysis.

[63] The top income tax rate in Canada, including provincial taxes, was about 50 percent in 2000.

that have experienced drastic cuts in top income tax rates in recent decades, as in the United States and the United Kingdom, would be of most interest. Those results could teach us whether a dramatic cut in top rates is necessarily associated with a rise in top incomes.

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