What Happens When You Tax the Rich? Evidence from Executive Compensation

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This paper examines the responsiveness of taxable income to changes in marginal tax rates using detailed compensation data on several thousand corporate executives from 1991 to 1995. The data confirm that the higher marginal rates of 1993 led to a significant decline in taxable income. Indeed, this small group of executives may account for as much as 20 percent of the aggregate change in wage and salary income for approximately the one million richest taxpayers over this time period; one person alone can account for more than 2 percent. The decline, however, is almost entirely a short-run shift in the timing of compensation rather than a permanent reduction in taxable income. The short-run elasticity of taxable income with respect to the net-of-tax share exceeds one in this sample, but the elasticity after one year is at most 0.4 and probably closer to zero. Breaking out the tax responsiveness of different types of compensation shows that the large short-run responses come almost entirely from a large increase in the exercise of stock options by the highest-income executives in anticipation of the rate increases. Executives without stock options, executives with relatively lower incomes, and more conventional forms of taxable compensation such as salary and bonus show little responsiveness to tax changes.

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I. Introduction

In the last two decades, the responsiveness of taxpayers to changes in marginal tax rates has become perhaps the most central empirical issue in public finance. It is fundamental for evaluating the revenue effects of tax changes, the deadweight loss of taxation, and even the optimal size of government. It is also the centerpiece of the vehement and ongoing public debates about the tax policies of the 1980s and whether tax cuts can generate their own revenue.

Nowhere is the debate more heated than at the very high end of the income distribution. Income tax changes of the 1980s and 1990s, both increases and cuts, have been largest for the rich. Concerns about inefficiency have led some to condemn the tax increases of the 1990s and praise the cuts of the 1980s. Concerns about rising inequality have led others to do the reverse. At the center of the debate is the amount of deadweight loss created by a progressive tax code. The responsiveness of taxable income to marginal rates is exactly what determines that cost and, in principle, is a strictly empirical matter.

For no group, however, could it be harder to estimate such a parameter than for high-income people. There is little direct evidence on the rich and their money. Every major publicly available data source has at least one flaw that limits its capacity to identify the tax responsiveness of the rich. Top-coded income variables, small numbers of observations at the high end, a lack of panel data on the same individuals over time, or the limits of the information reported on a tax return are only some of the problems commonly encountered.

This paper revisits the debate over the tax response of high-income people by using extensive panel data on the levels and forms of compensation for several thousand corporate executives from 1991 to 1995. From these data I estimate the elasticity of taxable income with respect to marginal rates in a way that does not suffer from some of the standard problems of the previous literature. Further, by turning to these new data, I can distinguish temporary shifts in compensation from more permanent behavioral changes. This distinction is one of the most important in the literature (see Slemrod 1992). The revenue implications of tax cuts, for example, hinge on whether changes in taxable income are made to the form of compensation or to the timing of compensation.

The results in this sample suggest that the taxable income of the rich may be highly responsive in the short run to increases in marginal tax rates, verifying the work of Feldstein and Feenberg (1996)

and others. In fact, the executives in this sample, despite making up only 1 percent of high-income taxpayers, may account for as much as 20 percent of the decline in the aggregate total wages and salaries among almost the top one million taxpayers to the Clinton tax increase of 1993. The results suggest, however, that this pronounced decline in taxable income comes almost entirely from a temporary shift in the timing of compensation. Taxable income spikes in anticipation of a tax increase and then falls in the year of a tax increase. For executives, the total effect is modest and often not significantly different from zero.

Disaggregating the compensation data by form verifies that timing shifts predominate in this time period. Almost all of the responsiveness is due to changes in the exercising of stock options by the very highest income executives. Indeed, executives without stock options, even those with quite high incomes, responded little to tax rates. Other forms of taxable income such as salaries and bonuses show little responsiveness. Some evidence indicates that nontaxable forms of income rise with marginal tax rates, but the small size of this category implies that it cannot explain the short-run response to taxation among these executives.

This paper will lay out the evidence about the tax responsiveness of the rich as follows: Section II presents a brief discussion of the literature on the relationship between tax rates and taxable income. Section III describes the data used. Section IV outlines the empirical strategy of the paper, and Section V presents results. Section VI presents a conclusion.

II. The New Tax Responsiveness Literature

In its original manifestation, the investigation of how marginal tax rates affect behavior focused on hours worked. In this view, tax cuts lead to an increase in labor supply and thereby lessen the revenue loss from the lower rates—the so-called Laffer curve. When empirical studies have looked for such behavioral responses, however, they have generally found that taxes seem to have little impact on hours, consistent with the notion of an inelastic short-run supply of labor. While this finding may be less true for women, the labor supply/behavioral response hypothesis has not received much empirical support (see Pencavel 1986; MaCurdy 1992; Heckman 1993; Eissa 1996).

In the last decade, however, a new literature has revived academic discussion of the Laffer curve but with an important change of focus. Rather than looking at how taxes affect hours worked, the papers in this new tax responsiveness (NTR) literature look instead at the

effect of taxation on total reported taxable income. The idea of this literature is that tax cuts, even if they do not increase the number of hours worked, may still increase revenue if they induce people to switch income out of nontaxable forms.[1] The NTR literature has shown that such responses can generate some of the same conclusions as the labor supply response model (see Feldstein, in press). Indeed, this literature has argued that it is taxable income, not hours worked, that policy makers should think about both for calculating revenue and deadweight losses and for calculating the optimal size of government and optimal tax rates (see Feldstein 1996; Slemrod and Yitzhaki 1996; Saez 1999).

The NTR literature has focused on estimating how responsive people have been to marginal rate changes over the last two decades such as the Economic Recovery Tax Act of 1981 (ERTA), the Tax Reform Act of 1986 (TRA86), and the Omnibus Budget Reconciliation Act of 1993 (OBRA93). Each of these bills substantially changed marginal tax rates, particularly at the high end. The ERTA and TRA86 lowered the top rates substantially, whereas OBRA93 raised the top rates. The NTR literature has sought to use these tax bills as "natural experiments" by assuming that the income of various groups would have grown at equal rates without a tax change and asking whether the groups with larger tax changes had larger income changes, using those with smaller tax changes as "control groups."[2]

On the basis of tax return data, this literature has generally found large elasticities. Lindsey (1987) and Feenberg and Poterba (1993) showed that, in cross-sectional data, the share of income generated by the top of the income distribution rose after ERTA81 and TRA86. Feldstein (1995) employed panel data on individual tax returns around TRA86 and explicitly treated the changes to progressivity as a natural experiment. Although he had only a small sample of high-income people, his evidence indicated that taxable income increased more for high-income people than for others. The magnitudes implied an elasticity of taxable income with respect to the net of tax share in excess of one. Auten and Carroll (1995, in press) examined a much larger (and not public) Treasury sample of tax returns around TRA86 and found a sizable, though significantly smaller, elasticity. Feldstein and Feenberg (1996) documented a

[1] There are also voluminous literatures studying the effect of marginal tax rates in many areas such as capital gains realizations, charitable contributions, fringe benefits, and health insurance. See Auerbach (1988), Woodbury and Huang (1991), or Clotfelter (1997) for surveys of some of these topics.

[2] Goolsbee (1999) gives an analysis of the natural experiment approach in the tax context and examines the responses from earlier years.

drop in taxable income of people at the top of the income distribution (whose taxes rose) from 1992 to 1993 and an increase in incomes for the next highest group (whose taxes did not rise as much), and they concluded that taxes had a large impact on taxable income.

The use of natural experiments to study tax changes, especially ERTA81 and TRA86, has been criticized for suffering from potentially serious biases.[3] Some problems arise simply from using tax returns as the data source, such as the fact that most of the major tax bills changed not only marginal tax rates but also the definitions of taxable income, requiring researchers to transform or impute the income data in different years to get comparable numbers.[4] A second such problem, documented in Goolsbee (2000*a*), is that incomes of the very rich may be more sensitive to firm-level performance than incomes of other groups; no firm-level data appear on a tax return to control for this.

A more serious problem with the natural experiment approach to analyzing the tax cuts of the 1980s is the failure to account for the upward, non-tax-related trend in income inequality over the same time period.[5] The ERTA81 and TRA86 cut taxes more for exactly the group whose real and relative wages have risen substantially, potentially creating a spurious correlation between tax cuts and rising taxable income at the top. Slemrod (1996) shows that rising inequality may account for all the estimated response to taxation before 1986, and Goolsbee (2000*a*) suggests that given reasonable values, rising inequality may significantly reduce estimated elasticities from TRA86 as well. Because the tax increase of 1993 was largest at the high end, it should not generate the upward bias in elasticities. It is this fact about OBRA93 that makes work on the responses around 1993 of key importance for evaluating the NTR literature.[6]

A final problem in the NTR literature has been the inability to distinguish between temporary shifts in the timing of compensation and more permanent shifts in the form of compensation. Slemrod

[3] Critiques of the use of natural experiments in the NTR literature can be found in Heckman (1996) and Goolsbee (2000*a*).

[4] A larger problem facing not just the NTR literature but all analysis of individual responses to tax rates is that many tax bills, and especially TRA86, change other provisions of the tax code simultaneously with the marginal rate changes in ways that may directly affect incentives to take individual income in taxable form (see Auerbach and Slemrod [1997] for an overview of TRA86). Gordon and Slemrod (2000), e.g., discuss the importance of shifting income out of corporate form.

[5] Discussions of the rising inequality can be found in Katz and Murphy (1992) or the survey of Levy and Murnane (1992).

[6] Indeed, the more recent work using tax return data such as Sammartino and Weiner (1997) and Carroll (1998) has found smaller elasticities of taxable income using individual tax return data in the 1990s than most of the NTR literature did using tax returns from the 1980s.

(1992, 1994*a*, 1995) has argued that there is a hierarchy of responses to taxation, with "real" behavior being least responsive, reporting behavior being in the middle, and simple timing of transactions being most responsive. A large empirical difference between permanent and temporary responsiveness to tax changes has been found for the case of capital gains realizations (Auten and Clotfelter 1982; Burman and Randolph 1994) and charitable contributions (Randolph 1995), and there are many reasons to think that it may apply to total taxable income as well. The NTR literature usually compares some year before a tax change to some year after. Preferably, these years are chosen sufficiently before and after the change that they do not contain timing shifts, as in most analyses of TRA86. If the estimated elasticity of taxable income with respect to tax rates across the two years, however, also includes the short-run timing of compensation, the elasticities will tend to be biased upward.

This distinction is most relevant for evaluating OBRA93: Feldstein and Feenberg (1996) documented a large fall in taxable income from 1992 to 1993, and the Treasury responded by suggesting that individuals shifted bonus and other income into 1992 in anticipation of the tax increases (see Parcell 1996). This paper was based on aggregate data and compared expected tax receipts in late 1992 and early 1993 to what was forecast. Understanding the nature and extent of temporary shifting among individuals, however, requires more comprehensive information about the forms of compensation and their timing than macro data can provide. Even individual tax return data may be insufficient given the lack of important types of information on such returns.

In this paper I shall attempt to evaluate the response of high-income taxpayers to the rate increases of OBRA93 using new data on high-income executives in order to avoid some of the main difficulties associated with using tax return data as well as to identify the importance of timing shifts.

III. Data

A. *Tax Increases of the 1990s*

The 1991–95 sample examined in this paper spans major changes to the tax code that can be used to identify the elasticity of taxable income. In 1992, Bill Clinton was elected president after promising to raise the taxes of high-income Americans. In 1993, Congress enacted an increase in marginal rates from .31 to .396 for income greater than $250,000 and from .31 to .36 for income between

$140,000 and $250,000.[7] It also passed legislation abolishing the Medicare tax cap starting in 1994, which amounted to an increase in the marginal tax rate of .029 for people with income greater than $135,000. Also included in the bill was a provision that eliminated the corporate deductibility of payments to executives in excess of $1 million unless they were performance based.

One of the key elements of the tax change of 1993 was that Clinton promised it in 1992. Once Clinton was elected in November 1992, many people had an incentive to adjust the timing of their income to avoid presumed future tax increases (similarly in 1993 for the Medicare tax increase of 1994). Such a timing shift would appear as a pronounced drop in taxable income from 1992 to 1993 in response to the tax increase of the same time period. Such a drop would not be a permanent response, however, and it would be misleading to use elasticities based on such short-run changes for longer-run deadweight loss or dynamic revenue calculations.

B. *Data on High-Income Executives: Advantages and Limitations*

Securities regulations of the United States require public companies to report the compensation of their five highest-paid employees. This paper uses data on the top five executives from 1991 to 1995 at corporations in the Standard and Poor's S&P 500, S&P Mid Cap 400, and S&P Small Cap 600. The data are kept by Standard and Poor's in its Execucomp database and come from the corporations' proxy statements and 10-K forms.

Three features make these data especially useful for analyzing the tax responsiveness of the wealthy. The first, and most obvious, advantage of these data is that the top executives of public companies are numerous and are very highly compensated, thus generating a sample of wealthy people that is as large as in any publicly available data source. The average real income of these executives from 1991 to 1995 was $852,000, and the median was $451,000. In the raw data there are 40,333 executive-years, with total taxable income of over $7 billion in 1993. To properly account for taxation, it is necessary to exclude firms with fiscal years that do not end in December (about 40 percent of the firms), since reported compensation for non-December firms straddles more than one tax year. The paper will also focus on individuals with at least four years of data.[8] Even

[7] These rates pertain to married individuals filing jointly.

[8] While this could potentially create a survivorship bias, including executives with fewer than four years of complete data did not change the results.

so, there are still up to 21,299 executive-years of data satisfying these criteria, depending on the type of compensation.

The second advantage is that the data follow the same individuals over time and separately report their income from salary, bonus, long-term incentive plan (LTIP) payouts, options exercised, and "other" income. This makes identifying the role of timing shifts much easier. Exercising options is the form of compensation whose timing is easiest to adjust. For tax purposes, the executive can adjust the timing of this type of compensation at will. Bonus and LTIP payouts (bonuses based on more than one year's performance) are less easy to adjust than stock options but are often paid out in lump sums at the end of the year so that they can potentially be shifted more easily than salary, which is usually paid smoothly over the year. "Other" income is a category largely made up of nontaxed forms of income such as extra fringe benefits and so on. If timing is important, this should be observable in the types of compensation that respond to tax changes.[9]

The third advantage of the data is that they do not exclusively cover the chief executive officers (CEOs) of large companies but also include non-CEO executives and executives at small companies. Many of these executives have high, but not tremendously high, salaries, creating the potential for cross-sectional variation in marginal tax rates. Almost 25 percent of the executives in the sample have less than $250,000 income and more than 5 percent have less than $150,000.

Despite these benefits, the data do have some unfortunate limitations. One of them is the fact that high-income executives may not be representative of other high-income people. The results will show that, in fact, executives seem to be much more responsive to taxation than other high-income people and account for a disproportionate share of aggregate income changes to taxation. Therefore, to the extent that the executives are not representative of the wider body of rich individuals, they may provide an upper bound on the overall tax responsiveness of wage and salary income. Even if they are not representative of other high-income people, however, the behavior of executives is interesting in its own right. The data in Carroll (1998) suggest that people describing their occupation as executives make up a large fraction of high-income people, and there is considerable public interest in executive compensation.

[9] The data also include the Black-Scholes value of options granted, but the data on that category do not begin until 1992, making it difficult to look at timing issues. For this reason I shall generally focus on currently taxable forms and the "other" nontaxed compensation.

A second difficulty with the data is the problem of defining total taxable income. While the compensation data have the advantage over tax return data that the definition of income is comparable across time and a strictly wage and salary component is easily calculated, they have the disadvantage that they are only one component of an individual family's taxable income and do not include things such as capital gains income, the income of the spouse, or the family's deductions.

It would be inappropriate to impute the average nonwage income of people in the top bracket for the executives because Slemrod (1994*b*) has shown that the distribution of income types in the highest-income group is very bimodal, with the largest group (around one-third of high-income people) having 90–100 percent of their taxable income in wages and salaries and the other mode at 0–10 percent.

To get a measure of taxable income, I shall have to make certain assumptions. First, the overwhelming majority of the executives are male and are over 50, so I assume that they do not have a working spouse and are married filing jointly. For simplicity, I also assume that they do not face the alternative minimum tax. Second, I shall assume that their taxable income is their income from the firm. I have tried assuming different levels of nonwage income, and the results are not sensitive to that choice, as I shall explain later.[10]

I define the individual's taxable income to be the sum of salary, bonus, options exercised in the year, and LTIP payments. The LTIP payouts are predominantly, but not always, cash. Sometimes they are shares of stock and therefore are not taxable in the current year, which will tend to bias the results toward finding no response of this form of compensation to tax rates. A similar problem exists for bonus income since some firms report bonuses for the current year but technically pay the bonus in an adjoining calendar year. This should not affect the estimates of longer-run changes but will tend to bias downward the estimated amounts of cross-year shifting.

The tax treatment of exercised options depends on the type of option. Nonqualified stock options (NQOs) are not considered income until exercised, at which time the difference between the stock

[10] Given the evidence in Slemrod (1994*b*), outside income may not be especially important for those individuals with very high wages and salaries. Further, unpublished tabulations by Robert Carroll from the Treasury's individual tax model and the statistics of income occupation/industry coding of individual tax returns for 1993 indicate that for executives, while the averages are high, the median income from dividends, capital gains, taxable interest, and business income were each around $5,000 or less and median schedule E income was less than $13,000. These are relatively minor relative to a median total income of $533,000 (note, however, that this is only illustrative since the sum of the medians is not the median of the sums).

price on the day of exercise and the option strike price is treated as ordinary wage income to the individual and is deductible for the firm. Further appreciation is treated as a capital gain on sale of the shares. Incentive stock options (ISOs) are not treated as income when granted, but they are not treated as income when exercised either. When the shares are actually sold, the difference between the sale price and the option strike price is treated as a capital gain for the individual and is not deductible for the firm.

In this paper I assume that all options are NQOs and thus treat the exercise of options as taxable wage and salary income. I do this because NQOs are overwhelmingly the more common type of option for executives. Surveys conducted by the Conference Board (*Top Executive Compensation*, 1991, 1992, 1994) show that about 95 percent of stock option grants involve NQOs, and almost three-fourths are exclusively NQOs.[11] When firms report the value of options exercised by the executive, they are reporting the amount in excess of the strike price that goes to the executive because this amount is deductible for the firm as wages.

I define the pay reported as "other" compensation to be the executive's nontaxable income. This category is defined by the Securities and Exchange Commission (SEC) to include anything not included in the other categories; while in theory this is not entirely nontaxable income, in practice it is predominantly so. Examining the footnotes of the proxy statements for a random subset of the firms in this sample suggests that the most common items appearing in the "other" compensation category are premiums for life insurance policies and company matching contributions to 401(k) retirement accounts. Firms are required to report any perquisites that total more than $50,000 or 10 percent of the executive's annual base salary and benefits, and such items do appear in the data. If executives change the form of their compensation in response to taxes, as the NTR literature suggests, the "other" compensation category should increase when rates rise.

With these components making up the definition of taxable and nontaxable income, it is then necessary to classify people according to tax bracket. In 1993, people earning more than $250,000 in taxable income per year faced a tax rate increase from .31 to .396. The sample choice should be made before the new tax, however, because people may have reduced their income enough to get into the lower bracket, and an ex post classification will mischaracterize them as being unaffected by the higher marginal rate.

[11] The NQOs were the overall tax-advantaged form of option in most cases. A discussion of the tax advantages of NQOs vs. ISOs can be found in Scholes and Wolfson (1992).

The previous literature has generally chosen people according to their income in some individual year prior to the tax change. To the extent that there is a temporary component to high income, however, mean reversion will be correlated with a tax increase and lead to overestimates of the impact of tax policy (this is especially important with the rising use of stock options). For this study, I look at the individual's average income over the entire five-year sample, take this as a measure of "permanent income," and divide the groups according to this income. To be more certain about the groupings, I select for the "high"-income group people with permanent income in excess of $275,000. Because this permanent income might be endogenous (higher rates induce lower income in the latter half of the sample, which lowers permanent income), in some specifications I shall use taxable income plus nontaxed perquisites as the measure of permanent income. Without labor supply effects (i.e., if taxes influence the form of compensation, not total hours worked), this combined level of permanent income will not be endogenous to tax rates. Although the income averaging or the choice of cutoffs might introduce error into the tax rate classifications and bias the results toward zero, the individual responses, as shown below, are driven by the very top of the income distribution and are not sensitive to using different cutoff levels or to different tax rate definitions.

C. *Data Description*

To put the results on executives in context, the first row of table 1 shows aggregate wage and salary income, as reported by the Internal Revenue Service (IRS), for various high-income taxpaying groups for 1992 and 1993.[12] The taxable income of the highest group decreased markedly, whereas the income of the lower group increased. This occurred precisely when relative tax rates rose substantially for the highest group. This comparison drives the NTR results of Feldstein and Feenberg (1996). That despite a growing economy real wage and salary income for high-income taxpayers fell by $8.2 billion is a striking fact that was almost certainly tax motivated. This change motivates the effort to understand better the effects of OBRA93.

[12] The table displays the aggregate totals for only two years because the IRS does not provide data on the same group of taxpayers across time. The total number of returns in the categories changes, and the farther apart the data are, the larger the problem. For the high-income group, e.g., there were 4 percent fewer returns in 1992 than in 1993. In 1991, there were almost 15 percent fewer.

TABLE 1

WAGE AND SALARY INCOME CHANGES (Real Dollars in Billions)

	Number of Returns	1990 Income	1991 Income	1992 Income	1993 Income	1994 Income	Income Change
				Total Population			
AGI $50,000–$200,000	19,581,200			1,142.7	1,190.5		47.80
AGI $200,000+	993,300			245.7	237.4		−8.27
				Executives			
Fiscal year:							
January–May	611	.53	.68	.57			−.11
December	4,103		3.31	3.95	3.52		−.43
June–November	1,399			.99	1.53	1.10	−.43
Total	6,133						−.97

NOTE.—Taxable income is taken from *Statistics of Income.* The number of returns pertains to 1993. Previous years had fewer high-income returns. The data on executives are taken from author's calculations.

The next three rows of table 1 repeat this exercise of the tax data but use data on the total income for various executives in the Execucomp data. The middle row corresponds to executives from firms using December fiscal years and having complete compensation data in 1992 and 1993. These are executives whose fiscal years correspond with the tax year. The pattern is the same as in the tax return data: total taxable income falls significantly from 1992 to 1993. In the IRS data, wages and salaries of almost the top one million taxpayers fell by $8.2 billion; the fall for the 4,103 executives examined in the middle row accounts for about 5 percent of the entire aggregate change.

The other two rows make a point about income timing by dividing executives into groups on the basis of the month their companies' fiscal year ends. The first group of executives work at companies with fiscal years ending from January 1 to May 31. By Execucomp's financial reporting convention, any extra income received in late calendar year 1992—from the exercise of stock options, for example—would appear in the fiscal year labeled 1991 for these executives. The other executives work at firms with fiscal years ending from May 31 to November 30. For these firms, any temporary income spike late in 1992 will be reported in the year labeled 1993. If income spikes in late 1992 are prevalent, the incomes of these otherwise identical executives should move in a staggered fashion. The rows in the bottom half of table 1 show that income rises and then falls with the predicted pattern.[13]

Although there are only 6,133 executives in these data—around 0.6 percent of the high-income taxpayers—attributing the combined income drops to the tax change suggests that their change in taxable income accounts for almost 12 percent of the aggregate drop in wage and salary income of the approximately top one million taxpayers. There are 4,636 more executives not included in table 1 because of missing data items for some type of income or some years. If their responses are similar, the 10,769 executives at the 1,500 S&P index companies made up about 1 percent of the top one million taxpayers but as much as 21 percent of the aggregate change in taxable wage income following the tax hike. Disney CEO Michael Eisner alone, by exercising almost $200 million in options on November 30, 1992, and zero in 1993, accounts for more than 2 percent

[13] To be included in these samples the early-month executives needed to have data in 1991 and 1992 and the later-month executives needed to have data in 1993 and 1994. For the year before the tax change in each of the three cases, I multiply the average salary in that year by the number of executives in the tax change year. This earliest year is meant only to show that the income drop was not an underlying trend but rather followed an increase in income.

TABLE 2

AVERAGE COMPENSATION BY TYPE FOR HIGH-INCOME EXECUTIVES
(in Thousands)

	1991	1992	1993	1994	1995
Taxable income	911	1,153	974	965	1,173
Salary	347	336	336	351	373
Bonus	198	207	241	284	330
LTIP payout	57	72	57	64	89
Options exercised	268	496	293	235	381
Other income (nontaxed)	36	37	66	54	78

SOURCE.—Author's calculations for executives with permanent income greater than $275,000 per year.

of the aggregate change, and the top five executives at another firm account for another 1.5 percent.

Subtracting out the income changes of the executives in table 1 from the aggregate IRS data suggests that the other 99 percent of high-income taxpayers must have elasticities of taxable income around 10 times smaller in the short run or else the aggregate change would be larger than $8.2 billion. For this reason, examining what drives the behavior of these executives is, potentially, a key element for explaining what happened to high-income wages and salaries in 1993 and puts an upper bound to the short-run response of other high-income people.

As in the previous evidence that suggested there might be a spike in income in late 1992, the main results of this paper are readily apparent when one looks at the raw data in table 2 on average taxable income for executives with permanent income greater than $275,000 from 1991 to 1995.[14] Average taxable income dropped significantly from 1992 to 1993, falling by $179,000 (almost 16 percent). When one looks more broadly at 1991–95, this followed a dramatic rise of 27 percent ($242,000) from 1991 to 1992, and the 1993 drop was not sustained.

Broken out into component parts, the data also support the idea of a temporary shift (the top group of income types are taxable and the bottom group are not). Salary did not fall, the growth of nontaxable forms of income did not rise by nearly enough to explain the drop in taxable income, and bonus payments actually rose. The raw data indicate that the change to taxable income in response to taxation is composed entirely of a substantial increase in the exercising

[14] These are executives from the standard sample, meaning that they have December fiscal years and data on all types of compensation for at least four years. Again, allowing executives with fewer years of data did not make a difference to the results.

of options in 1992 followed by a dramatic decrease in 1993—suggesting a simple timing shift rather than a permanent response.

At least anecdotally, this shifting was noted at the time. A *Business Week* article in December 1992 even reported that the rush to cash out options in the final weeks of the year to avoid higher taxes had caused executives to label the episode as "the Big Flush." The regressions below will control for various other economic factors but, in the end, will merely confirm what table 2 already shows. The responses of executives to the tax changes of the 1990s were largely changes to the timing of compensation, not the form of compensation. Reports of longer-run effects of "the Big Flush" may be greatly exaggerated.

IV. Empirical Strategy

Differentiating the short-run responses of income to marginal tax rates from the more permanent responses requires a specification that allows the executives to anticipate as well as react to tax changes.[15] The standard specification takes the form

$$\ln(\text{income}_i) = \alpha_i + \beta \ln(1 - \text{tax}_{it+1}) + \delta \ln(1 - \text{tax}_{it}) + X_{it}'\Gamma + \epsilon_{it},$$

where the tax terms represent the marginal tax rates next period and this period and the X's are other controls that can vary by executive-year (such as firm performance) or just by year (such as year dummies). If short-run timing changes and anticipation are important, future tax increases should increase current taxable income and current taxes should reduce it ($\beta < 0$ and $\delta > 0$). The nontransitory elasticity (sum of the two coefficients) should be smaller than the short-run elasticity (just δ), and the changes should be concentrated in forms of compensation that are easy to retime such as the exercising of options. If, instead, the NTR literature is correct that the changes in taxable income are, in fact, permanent shifts of compensation out of taxable form, the longer-run elasticity should still

[15] In this paper I speak of "longer-run" and "nontransitory" elasticities to contrast them with simple timing shifts. I do not mean to suggest that they are permanent elasticities. Individuals can adjust many margins in the long run that are not captured in data of this type (or in other standard micro data) such as choices to change occupations, become entrepreneurs, retire early, and so on. Such flexibility may imply much larger long-run elasticities than in estimates such as these. Actually estimating a true long-run elasticity, however, would be complicated rather seriously by the transitory nature of tax changes in the last 30 years as well as many other confounding factors. The longest-run estimates in the existing literature come from Carroll (1998), who uses a more comprehensive panel of tax returns than the rest of the literature.

be large, and further disaggregating the data by form of compensation should show decreases in taxable forms of income and increases in nontaxable forms.

The paper will present several alternative types of specifications because the data on compensation are notably heterogeneous. The analysis of total taxable income can be performed in the standard log regression form shown above that yields a constant elasticity of taxable income with respect to the net-of-tax share. For many forms of compensation individually, however, this procedure does not work because a sizable fraction of executives have no income of a given type in a particular year. Nontaxable perquisites, LTIP payouts, and the exercising of options have many zeros. The overall levels of compensation are also quite heterogeneous across individuals. To deal with such problems, I shall use a variety of methods including linear fixed-effect regressions, first-difference regressions, and sample splits. I shall also use natural experiment type estimators exploiting the cross-sectional variation in tax rates. The results are basically the same no matter how the data are analyzed.

The specifications will explain total compensation using information about the individual, the economy, the firm, and its financial performance. The Execucomp data list the companies by name and thus allow for better controls for the economic environment the individual faces than tax return data do. With the controls, the regressions test whether, when tax rates fall, taxable compensation is lower than company performance and other factors would predict. In choosing nontax factors that influence executive pay, I generally follow the standard executive compensation literature and include controls for the market value of the company, corporate earnings, rates of return, and time trends.[16] In some specifications, cross-sectional variation in the tax rate will allow the regressions to include year dummies and identify the tax responsiveness using differences in differences.

V. Results

A. *Income Changes: Identifying Temporary Shifts*

The results begin with a conventional regression of the log of total taxable income on the log of the net-of-tax share. Column 1 in

[16] For discussions of the issues in this literature, see Rosen (1992) or Hall and Liebman (1998). Goolsbee (2000*b*) also examines the role of current and past stock returns on income.

table 3 presents this regression for executives with real permanent income greater than $275,000 and without any other controls: only the current tax term, individual fixed effects, and a time trend to account for income growth. The elasticity of taxable income with respect to the net-of-tax share is estimated at almost 1.3.

Column 2 allows both current and future tax changes to affect income and controls for firm-level factors, including the real market value of the firm, the ratio of firm earnings to the book value of assets, and the log of the net-of-corporate-tax share for executives estimated to face the nondeductibility of executive compensation constraint.[17] The results suggest that the elasticity of taxable income with respect to the current net-of-tax share still exceeds one, just as in column 1. This is, however, strictly a timing shift. The large drop in the year of a tax change follows an equally dramatic anticipatory increase in the year before a tax change—a textbook example of temporary shifting. The size of the temporary shift may even be biased downward by the assumption that executives could perfectly forecast future tax rates. The nontransitory elasticity is the sum of the two coefficients, and it is less than .4.

The loss of deductibility for millionaires does appear to have an impact on taxable income, though modest, presumably because the executives tended simply to shift more of their pay into "performance"-based forms (e.g., options) to get around the tax (see Woodlock and Antenucci [1997] or Rose and Wolfram [2000] for more discussion). The other control variables have the expected signs.

To show that the potential endogeneity of income and tax rates is not a problem, column 2A repeats the specification of column 2 but uses tax rates calculated from permanent income including perquisites. As argued above, this measure of permanent income is much less likely to suffer from endogeneity. There are more executives with missing values of "other" compensation (hence the smaller number of observations), but the estimated coefficients on the tax terms are nearly identical.[18]

To show robustness, column 3 repeats the analysis of column 2 but in first differences. The results are, again, almost identical.

Columns 4–6 then present the regression equivalents of the natural experiment literature by including year dummies and identifying the taxable income response using only the cross-sectional variation

[17] Payments to the executive based on performance remained deductible. Since this embodies virtually any bonus, LTIP payout, or stock option income, I consider an executive to face this nondeductibility tax if the real value of the salary component of total compensation exceeds $1 million in any year previous to the tax change.

[18] The results also did not change if I used tax rates based on actual income but instrumented for them using these permanent income tax rates.

TABLE 3

RESPONSE OF TAXABLE INCOME

	First Difference						
	No (1)	No (2)	No (2A)	Yes (3)	No (4)	No (5)	Yes (6)
$\ln(1 - \text{tax}_t)$	1.288	1.159	1.113	1.224	.873	1.152	1.427
	(.126)	(.119)	(.123)	(.107)	(.324)	(.316)	(.338)
$\ln(1 - \text{tax}_{t+1})$		−.763	−.893	−.887		−1.325	−1.356
		(.106)	(.109)	(.118)		(.350)	(.385)
$\ln(1 - \text{tax}_c) \times [I > 0]$		.282	.314	.123		.322	.189
		(.140)	(.139)	(.198)		(.133)	(.187)
ln(market value)		.610	.592	.261		.212	.094
		(.014)	(.014)	(.010)		(.022)	(.017)
Earnings/assets		.510	.549	.191		.132	−.048
		(.056)	(.058)	(.062)		(.120)	(.128)
Time	.169	.077	.071	.084		...	...
	(.007)	(.008)	(.008)	(.009)			
[Top-bracket] × time					.055	−.008	.008
					(.010)	(.010)	(.015)
[Top-bracket] × market value						.408	.174
						(.025)	(.019)
[Top-bracket] × earnings						.345	.202
						(.131)	(.140)
Year dummies	no	no	no	no	yes	yes	yes
Observations	16,895	16,477	13,835	11,493	21,807	21,299	14,429
R^2	.73	.77	.77	.07	.82	.84	.07

NOTE.—The sample in each regression pertains to 1991–95. The dependent variable is either the log of taxable income or the first difference of log taxable income. Cols. 1–3 look at executives with permanent income greater than $275,000 per year. Cols. 4–6 look at all executives. Col. 2A uses tax rates calculated with permanent income including perquisites. All regressions in levels include individual fixed effects. The term $\ln(1 - \text{tax}_c) \times [I > 0]$ gives the net-of-corporate-tax share for individuals with more than $1 million in salary in a year previous to the nondeductibility rule. The other variables are defined in the text and are first-differenced in cols. 3 and 6. The time variable is a time trend in the levels regressions and a constant in the first-difference regressions. The top-bracket terms are the variables interacted with a dummy indicating that the executive has permanent income greater than $275,000. Standard errors are in parentheses.

in marginal rates. Column 4 repeats the naive specification of column 1, and, again, the elasticity of taxable income is, at almost .9, quite high and not significantly different from one. Once I allow for a transitory component, however, as in the levels regression of column 5 or the first-difference regression in column 6, the results suggest that the large estimated elasticity is not a permanent effect.[19] The short-run elasticity in column 6 is 1.43, but the nontransitory elasticity is only .07—approximately 20 times smaller. In column 5, there is an equally large difference between the short- and long-run elasticities, and here the permanent effect is actually negative, though not significantly different from zero.

B. Total Taxable Income: Who Responds?

Slemrod (1994*b*) and Goolsbee (2000*a*) argue that the technology of tax avoidance varies by income level. Such a claim motivates examining whether the timing shifts are larger for higher-income executives who may have better access to avoidance strategies. Columns 2–4 of table 4 show regressions for total taxable income looking at the highest-income group but dividing it into three subgroups: those with permanent income between $275,000 and $500,000 per year, between $500,000 and $1,000,000 per year, and over $1,000,000 per year. The coefficients in each regression are comparable to those using the full sample (repeated here in col. 1).

The results suggest that the short-run tax response is concentrated at the very high end of the distribution. The short-run elasticity is .39 for the bottom group, .81 for the middle group, and 2.21 for the top group. The nontransitory elasticities, however, are very similar across the groups—ranging from .35 to .55—and not significantly different from each other or from zero. Basically the bottom group of high-income executives did not change their income in anticipation of the rate increases (an elasticity with respect to next year's net-of-tax share of only .05), whereas the top group had significant anticipation (an elasticity of 1.66). This is largely timing, however, since the longer-run elasticities are approximately equal. These results help clarify why the classification of individuals' tax rates makes little difference to the results. The response to taxation among executives is concentrated in groups in which income is so high that bracket classification is not an issue.

[19] Each of the results allows for the coefficients on the time trend and the firm-level factors to vary by income class to avoid some of the standard problems of varying income trends and demand responsiveness by income class confronting most natural experiment methods as described in Goolsbee (2000*a*).

TABLE 4

RESPONSE OF TAXABLE INCOME FOR VARIOUS GROUPS

	PERMANENT INCOME GROUP						
	All Executives >$275,000 (1)	$275,000–500,000 (2)	$500,000–1,000,000 (3)	>$1,000,000 (4)	OPTIONS No (5)	OPTIONS Yes (6)	SALARY AND BONUS (7)
$\ln(1 - \text{tax}_t)$	1.159	.394	.810	2.218	.290	1.289	.150
	(.119)	(.139)	(.178)	(.281)	(.311)	(.128)	(.073)
$\ln(1 - \text{tax}_{t+1})$	−.763	−.051	−.433	−1.663	−.181	−.853	−.060
	(.106)	(.132)	(.158)	(.240)	(.279)	(.115)	(.065)
$\ln(1 - \text{tax}_c) \times [I > 0]$	.282	. . .	.851	.140	.943	.175	.187
	(.140)		(.639)	(.189)	(.344)	(.153)	(.094)
ln(market value)	.610	.337	.559	.999	.518	.619	.289
	(.014)	(.015)	(.021)	(.033)	(.041)	(.015)	(.008)
Earnings/assets	.510	.311	.681	.823	.344	.542	.423
	(.056)	(.059)	(.089)	(.144)	(.129)	(.062)	(.035)
Time	.077	.068	.073	.061	.060	.079	.082
	(.008)	(.009)	(.012)	(.019)	(.020)	(.008)	(.005)
Year dummies	no	no	no	no	no	yes	no
Observations	16,477	5,918	5,680	4,879	2,122	14,330	18,628
R^2	.77	.41	.41	.58	.76	.77	.85

NOTE.—The sample in each regression pertains to 1991–95. The dependent variable is the log of taxable income. Cols. 1–4 look at executives with permanent income in the listed ranges. Cols. 5 and 6 look at executives divided by whether or not they received any options from 1992 to 1995 . Col. 7 looks at taxable income without options exercised. All regressions include individual fixed effects. Standard errors are in parentheses.

The earlier data summary suggested that exercising options might be the mechanism executives use to shift the timing of compensation. Columns 5 and 6 examine this point in more detail by showing the responsiveness of total taxable income for executives who do not receive any stock options in the sample (col. 5) versus executives who do (col. 6), taking this as a proxy for whether the executive has any options on hand. The only significant responses to taxation come from executives who receive stock options, and those responses appear to be transitory. For executives who do not receive stock options in the sample, there is no significant impact of marginal rates on taxable income. It is interesting that the impact of the nondeductibility of compensation rule is important only for executives without stock options. This may suggest that options serve as the means of getting around the regulation by making pay performance-based.

Column 7 then looks at the income response of high-income executives when the value of options exercised is excluded. This modified taxable income is composed entirely of the standard types of wage income, that is, salary and bonus (both regular bonus and LTIP payouts). But whereas the short-run elasticity of taxable income in column 1 was 1.16 and there was substantial anticipation of future rates, the short-run elasticity of nonoption income is only .14, and there is no significant anticipation of future rates. When their effect on the timing of option exercise is taken out, taxes seem to have little impact on income.[20]

C. *Taxable Income Disaggregated by Form of Compensation*

The evidence using total taxable income suggests that the response to marginal tax rates is much higher in the short run, is concentrated at the top, and seems to be centered around the use of stock options. To corroborate the apparent importance of timing shifts and options, table 5 presents the tax responsiveness of the various individual components of total compensation. Because there are numerous zeros in the income data when disaggregated by type of compensation, the regressions cannot simply look at the log of each type of income. Instead, the columns of table 5 look at the first difference of income in absolute levels. The actual coefficients are influenced by major outliers, but the qualitative results are robust.

[20] Huddart (1997) provides interesting evidence on the option exercise decision surrounding the tax increase of 1993 for all option holders at four companies (not just the top five executives) that shows that taxes seem to matter for the exercise decision.

TABLE 5

RESPONSIVENESS OF ALTERNATIVE FORMS OF PAY

	REAL COMPENSATION				
	Δ(Taxable Income) (1)	Δ(Cash) (2)	Δ(LTIP) (3)	Δ(Nontaxable Income) (4)	Δ(Options Exercised) (5)
$\Delta \ln(1 - \text{tax}_t)$	3,314	−41	227	−78	3,141
	(348)	(69)	(71)	(67)	(326)
$\Delta \ln(1 - \text{tax}_{t+1})$	−1,797	−115	−7	248	−1,598
	(384)	(75)	(77)	(94)	(361)
$\Delta \ln(1 - \text{tax}_e) \times [I > 0]$	1,305	4	−334	60	1,670
	(645)	(138)	(140)	(128)	(605)
$\Delta \ln$(market value)	328	56	13	5	247
	(32)	(6)	(6)	(6)	(30)
ΔEarnings/market	−203	80	−35	14	−276
	(202)	(41)	(42)	(40)	(190)
Constant	157	44	18	20	106
	(30)	(6)	(6)	(6)	(28)
Observations	11,493	13,717	13,720	12,215	11,494
R^2	.02	.01	.01	.01	.02

NOTE.—The sample pertains to 1991–95. The dependent variable is the first difference of real compensation. Each of the regressions pertains to executives with permanent income greater than $275,000 per year. A constant term indicates the presence of a time trend. Standard errors are in parentheses.

Column 1 shows that the pattern for total compensation is the same in absolute differences as in the log regressions. There is a significant increase in taxable income in the year previous to a tax increase and a subsequent drop in the year of the tax change. When the tax change from 1992 to 1993 is evaluated, the coefficients imply that the 14 percent decrease in net-of-tax share in 1993 raised taxable income in 1992 by $252,000 and lowered it in 1993 by $463,000.[21]

Column 2 looks at the regression for the salary and bonus component alone. The evidence suggests that this category cannot account for the changes in total income. There is only a small increase in cash compensation in the year preceding the tax change, about $23,000, which is not significantly different from zero, and there is no decrease in such income when taxes rise. Separating salary and bonus yielded the same small effects on each.

Column 3 looks at LTIP payouts. The data show some responsiveness to current taxes. The magnitude, however, estimated at $32,000 for the increase of 1993, cannot explain the $463,000 drop in taxable income for the average executive in that year. Column 4 looks at nontaxable income and shows that the sign is correct: higher current tax rates increase the amount of nontaxable pay. The coefficient is small, however, and the sum of the two tax coefficients is insignificant and has the wrong sign. While nontaxed compensation rose by $11,000 in the year of the tax change, it fell by $34,000 in the year preceding the tax change. This small effect, which has, cumulatively, the reverse sign, suggests that it is unlikely that shifts from taxable to nontaxable forms of compensation, such as hypothesized in the NTR literature, are the source of the observed tax responses for these executives. This merely confirms what could be determined by looking at the magnitudes in column 1: it is difficult to conceive how an executive could reduce taxable income by $463,000 and replace it with an equivalent nontaxed perquisite. It is difficult to think of such a perk and almost certain that the SEC would require such a perk or collection of perks to be reported as "other" compensation.

Column 5 then examines the change in the value of options exercised and suggests that the disaggregated data are fully consistent with the results in previous tables. Virtually all the absolute changes in taxable income for high-income executives result from short-run changes in the exercising of options. The coefficients indicate that options can explain between 90 and 95 percent of changes in taxable income in the years surrounding the tax changes.

[21] Removing the effect of the largest outliers by using median regression yields a $50,000 increase and a $100,000 decrease.

VI. Conclusion

While there is substantial interest in the subject of how marginal tax rates affect taxable income, there is controversy over how rich people respond to taxes. Evidence from the 1980s may be subject to important biases. This paper has used detailed data on the compensation of several thousand corporate executives to reexamine the issue in the 1990s. It shows that in this group of high-income people, almost all of the estimated responsiveness of taxable wage and salary income to marginal rates from 1991 to 1995 was the result of shifts in the timing of compensation, in the spirit of Slemrod (1995), not permanent shifts in the form of compensation.

The short-run elasticity of taxable income with respect to the net-of-tax share exceeds one, but taking out the temporary component yields longer-run elasticities between zero and .4. The biggest short-run responses are concentrated among very rich executives and those who have stock options. There is virtually no response of taxable income when the exercise of stock options is excluded, and the disaggregated data verify that the vast majority of the changes in taxable income come from variations in the timing of option exercises. Salary and bonus do not fall in response to changes in marginal rates, and while there is some evidence of an increase in nontaxable forms of income, the magnitude is nowhere nearly large enough to explain the drop in taxable income from 1992 to 1993. The temporary shifts of this particular sample are important in their own right. These few thousand executives may account for as much as 21 percent of the aggregate decline in wage and salary income of almost the top one million taxpayers from 1992 to 1993.

The results show that using more detailed data on compensation can illuminate features of individual responses that are difficult to detect from tax return data. They also suggest that taxing the rich can lead to dramatic shifting of taxable income in the years immediately surrounding a tax change. Such changes may allow many to avoid taxation for a short period of time and may wreak havoc on contemporaneous revenue estimates. But after the shifting is done, the total changes in taxable income, at least in this sample, seem to be more limited and the deadweight loss of progressivity more modest than previous work has suggested.

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