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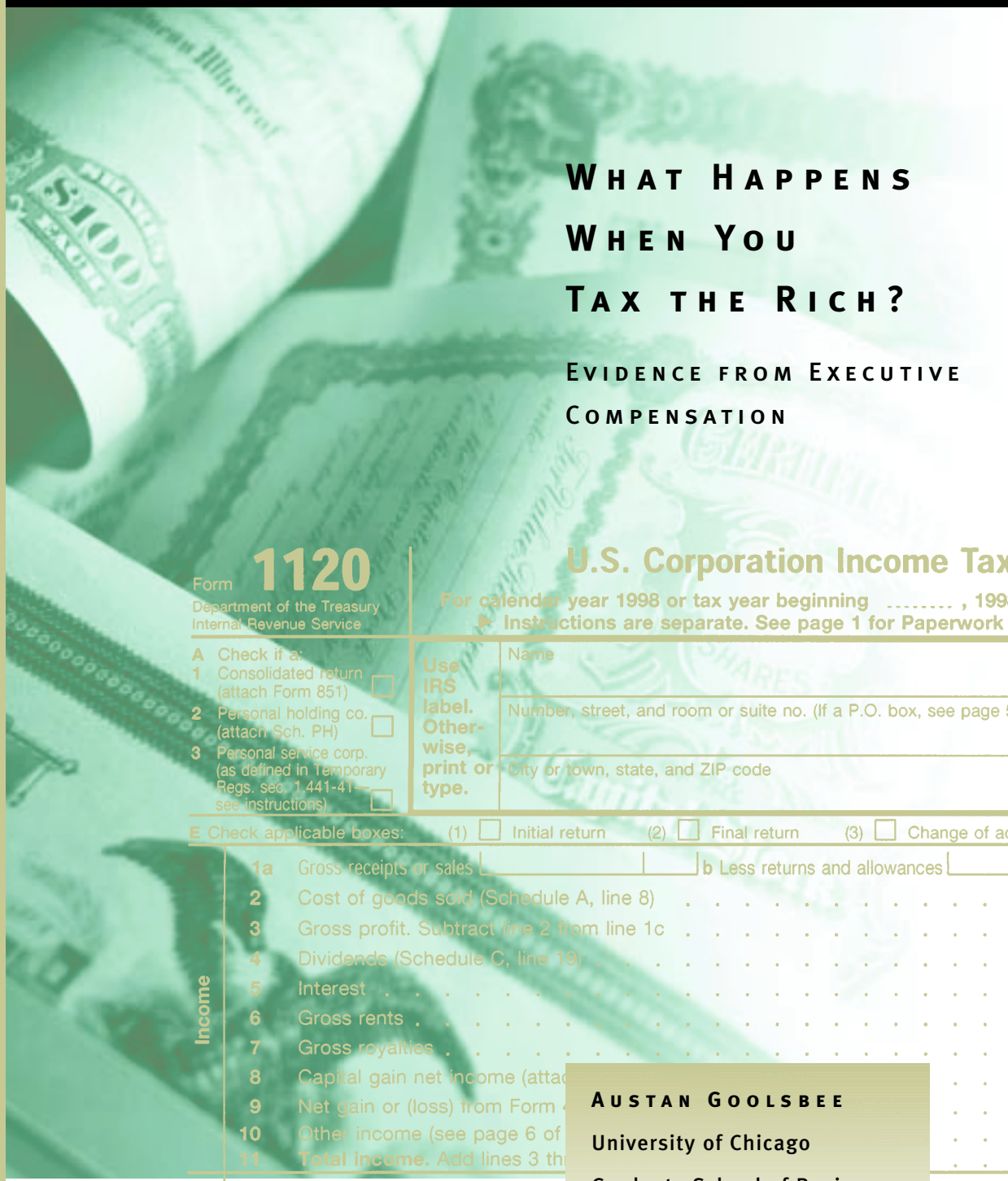

What Happens When You Tax the Rich?

Evidence from Executive Compensation

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Abstract

This paper examines how highly paid taxpayers respond to changes in marginal tax rates. It uses detailed compensation data on several thousand corporate executives from 1991 to 1995. These data confirm that the higher tax rates of 1993 led to a significant decline in taxable income. (Indeed, this small group of executives accounted for 20 percent of the total change in salary income for the one million richest taxpayers. One person alone accounted for more than 2 percent of the total change.) However, that decline was almost entirely a short-run shift in the timing of compensation, not a permanent reduction in taxable income. (The short-run elasticity of taxable income exceeds one but the elasticity after one year is at most 0.4 and probably close to zero.) Almost all of the reduction in taxable income came from one cause: many executives exercised stock options in the year before the tax change, 1992. Naturally, a decline in total taxable income followed in 1993, the year of the tax change; the decline was concentrated among executives with the biggest incomes. Executives without stock options were six times less likely to respond to increased taxes. Other types of compensation such as salary and bonus or nontaxed income either did not show a decline or were not large enough to make a difference. My estimates indicate that the deadweight loss of recent tax increases was around 15 to 25 percent of the new revenue generated.

INTRODUCTION

In the last two decades, how taxpayers respond to changes in tax rates has become the central issue in public finance. The answer to this question is vital for evaluating the revenue effects of tax changes, the deadweight loss of taxation, and even the optimal size of government. This issue is also the centerpiece of the dramatic public debates about the tax policies of the 1980s and whether tax cuts can generate revenue.

Nowhere is the debate more heated than when the disputants argue about taxpayers with the biggest incomes. 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 increased taxes on the wealthy. The responsiveness of taxable income to marginal rates is exactly what determines that cost and is, in principle, a strictly empirical matter.

For no group, however, could it be harder to estimate the deadweight loss than for high income people. There is little direct evidence on the rich and their money. Every available data source has at least one flaw that limits its capacity to tell us how the rich respond to tax raises. Top-coded income variables, small numbers of observations at the high end, a lack of panel data on the same individuals year after year, and the extremely limited information on tax returns are only some of the problems. Analysis is difficult, the results highly debatable.

This paper uses extensive new panel data on the levels and forms of compensation for several thousand corporate executives from 1991 to 1995. From these data I derive estimates of the elasticity of taxable income that do not suffer from most of the problems of previous studies. Further, the data are rich enough that I can distinguish between timing shifts and behavioral shifts. 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 changes in the form of compensation or in the timing of compensation—but has been largely untestable up to now.

My paper shows that the taxable income of the rich is highly responsive to increased marginal tax rates in the short run, verifying the recent work of the New Tax Responsiveness (NTR) literature summarized in Feldstein (1996) and others. In fact, the executives in my sample, only 1 percent of high-income taxpayers, account for as much as 20 percent of the total salary decline among the top million taxpayers. This pronounced decline in taxable income, however, is almost entirely a temporary shift in the timing of compensation. Taxable income shoots up in the year preceding the tax increase; short-run taxable income drops only relative to the inflated base of the year

preceding the tax increase. The *total* effect is quite modest and almost never significantly different from zero.

Separating the compensation data by type of income verifies that timing shifts predominate. Almost all of the change in total taxable income results from the exercising of stock options by the very highest-paid executives. Indeed, executives without stock options, even if they have quite high incomes, show very little interest in avoiding increased taxes. Other forms of taxable income, such as salary and bonus, show virtually no short-run responsiveness; those that do, such as Long-Term Incentive Plan (LTIP) payouts, are just not large enough to matter. Some evidence indicates that nontaxable forms of income rise with increased tax rates, but the small size of this category implies that it cannot explain the short-run responsiveness at all.

This paper will lay out the evidence about the tax responsiveness of the rich and includes a brief discussion of the NTR literature on the relationship between tax rates and taxable income, a description of the data used, an outline of the empirical strategy of the paper, the results, and my conclusions.

THE NEW TAX RESPONSIVENESS LITERATURE

In its original manifestation, the issue of how marginal tax rates affected behavior centered on hours worked. In this traditional formulation, the behavioral response created by tax cuts was an increase in labor supply. When traditional studies looked for such behavioral responses, however, they found that taxes seemed to have very little impact on hours. This finding is consistent with the notion of an inelastic short-run supply of labor (see Macurdy, 1992, or the surveys of Pencavel, 1986, and Heckman, 1993). While this finding may be less true for women (see Eissa, 1996), overall, the labor supply/behavioral response argument has not received much empirical support.

In the last decade, the emphasis in the debate has shifted. A new literature again claims that tax rates have a large impact on behavior. Rather than looking at how taxes affect hours worked, however, the New Tax Responsiveness (NTR) literature looks at the effect of taxation on total reported taxable income, particularly for high-income people. The idea of the NTR literature is that people shift income out of taxable form when rates rise. This assumption generates some of the same conclusions as the old model but without the need for finding effects on hours worked. Because the rich, presumably, have the most discretion over their income, they ought to have the largest behavioral responses. As Feldstein (1995b) argues, taxable income, not labor supply, is the variable that policy makers should be concerned about when they calculate revenue and deadweight loss. The marginal deadweight loss from taxation is also a key determinant in the optimal size of government (see Feldstein, 1996, or Slemrod and Yitzhaki, 1996).

The NTR literature has centered around the tax changes of the last two decades, especially the Economic Recovery Tax Act of 1981 (ERTA), Tax Reform Act of 1986 (TRA86), and the Clinton tax bill of 1993 (OBRA93). Each of these bills substantially changed marginal tax rates and changed them much more at the high end. ERTA and TRA86 lowered the top rates substantially whereas OBRA93 raised the top rates. The NTR literature has used these tax bills as "natural experiments" by comparing the response of the rich to other groups and assuming that the groups' incomes would have grown the same but for the differences in taxes.

The NTR literature has expanded rapidly and, if true, has important implications for the setting of tax policy. 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 rises after ERTA81 and TRA86. Feldstein (1995a) employed panel data on individual tax returns around TRA86 and explicitly treated the changes to progressivity as a "natural experiment." Although he had a very 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 of greater than 1. Auten and Carroll (1995, 1997) examined a much larger (and not public) Treasury sample of tax returns around TRA86 and found significantly smaller, though still sizable, elasticities. Feldstein and Feenberg (1996) documented a drop in taxable income of people at the top of the income distribution (whose taxes rose) from 1992 to 1993 but an increase in incomes for the next highest group (whose taxes did not rise as much) and concluded that taxes have a large impact on taxable income.

Generally, the NTR literature has found large elasticities in response to taxation, but the use of "natural experiments" to study tax changes, especially ERTA81 and TRA86, has been criticized for suffering from potentially serious biases.[1] Two problems with any results using tax returns are the changing definitions of taxable income and the differing income sensitivities to firm performance by income class. Beyond the fact that the tax bills of the 1980s changed many provisions which impact the incentives for reporting taxable income, not just individual marginal rates (see, for example, Auerbach and Slemrod, 1997, or Gordon and Slemrod, 1997), the major tax bills also changed the definitions of taxable income, requiring researchers to transform and impute the income data in different years to get comparable numbers with tax return data. Further, Goolsbee (1997) shows 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. These two problems made me decide to use data on the rich which do not come from tax returns.

A third, more serious problem with the NTR papers based on the tax cuts of the 1980s is the failure to account for the upward trend in income inequality over the same time period—a trend unrelated to taxation.[2] ERTA81 and TRA86 cut taxes more for

[1] Critiques of the use of natural experiments in the NTR literature can be found in Goolsbee (1997) and Heckman (1996).

[2] Nontax explanations of rising inequality can be found in Katz and Murphy (1992) or the survey of Levy and Murnane (1993).

exactly the group whose real and relative wages have risen substantially, potentially creating a spurious correlation between low tax rates and higher taxable income at the top. Slemrod (1996) shows that rising inequality may account for all the estimated response to taxation before 1986 and Goolsbee (1997) suggests that 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 which makes work on the responses around 1993 of key importance for evaluating the NTR literature.

The final flaw of the NTR literature has been the inability to distinguish between permanent shifts to the form of compensation and temporary shifts to the timing of compensation. Slemrod (1992, 1994a, 1995) has argued that there is a hierarchy of responses to taxation with "real" behavior being least responsive, reporting behavior 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 is every reason to think it may apply to total taxable income as well.

This distinction is especially important for evaluating OBRA93 where Feldstein and Feenberg (1996) documented a large fall in taxable income from 1992 to 1993 and the Treasury responded by saying that firms shifted bonuses into 1992 in anticipation of the tax increases.[3] The NTR literature usually compares some year before the tax change to some year after. If the estimated elasticity of taxable income with respect to tax rates across those two years actually measures only the short-run timing of compensation, then the more permanent elasticity of taxable income is much smaller and the deadweight loss much more modest than implied in the NTR. A definitive answer requires more comprehensive information on the forms of compensation and their dynamics.

This paper attempts to evaluate the response of high-income taxpayers to the rate increases of OBRA93 in light of these problems with the existing literature using new data on high-income people.

[3] The argument about bonus shifting was made by Toder (1995) and Parcell (1996). The debate continues with contemporaneous work using tax return data by Sammartino and Weiner (1997) finding a small longer-run elasticity of taxable income and Carroll (1997) finding a large one. The data are subject to the problems of unobserved variables described in Goolsbee (1997), so the choice of the sample and the control group used in the "natural experiment" matters critically for the results.

DATA

TAX INCREASES OF THE 1990S

The 1991 to 1995 sample examined in this paper spans major changes to the tax code which I use to identify the elasticity of taxable income. In 1992, Bill Clinton promised to raise taxes on high-income Americans. In 1993, Congress enacted a tax increase from 31 percent to 39.6 percent for incomes greater than $250,000 and from 31 percent to 36 percent for incomes between $140,000 and $250,000. It also passed legislation abolishing the Medicare tax cap starting in 1994, which amounted to an increase in the

marginal tax rate of 2.9 percent for people with incomes greater than $140,000. Also included in the bill was a provision that made payments to executives in excess of $1 million nondeductible at the corporate level if they were not "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. Such a shift would appear in the NTR literature as a pronounced drop in taxable income from 1992 to 1993. Such a drop, however, would not be a permanent response and therefore it would be misleading to use elasticities based on such a change for deadweight loss or dynamic revenue calculations.

Data on High Income Executives: Advantages and Limitations

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

Three features make these data especially good for analyzing the tax responsiveness of the wealthy. First, and most obvious, the top executives of public companies are very well compensated and there are many of them, generating a sample of wealthy people that is as large as in any publicly available data source. The average real taxable income in 1992 dollars of executives from 1991 to 1995 is $852,000, and the median is $451,000.

The raw data have 40,333 executive-years with total taxable income of over $7 billion in 1993. To properly account for taxation, though, particularly issues of timing, 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 embodies more than one tax year. To include full variation in the tax changes, I focus on individuals with at least four years of data.[4] Even so, there are still up to 21,299 executive-years of data satisfying these criteria, depending on the type of compensation.

Second, the data follow the same individuals over time and separately report their income from salary, bonus, LTIP payout, options exercised, and "other" income. Exercising options is the form of compensation whose timing is easiest to adjust because the executive can do so independently. Bonus and LTIP payouts are less easy to adjust than stock options but because they are usually paid out in discrete amounts at the end of the year, they can potentially be shifted. Salary, which is usually paid smoothly over the year, is less easy to retime. "Other" income is a category largely made up of nontaxed forms of income such as extra fringe benefits, perquisites and so on. The data include the Black-Scholes value of options granted but the data do not begin until 1992, making it difficult to look at timing issues. For this reason I will not look at

[4] While this could potentially create a survivorship bias, the results do not indicate this is a problem. Using executives with fewer years of data gave similar results.

this category of income, focusing instead on the currently taxable forms and the "other" nontaxed compensation.

Third, the data do not look only at the 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 some cross-sectional variation in marginal tax rates. Almost 25 percent of the sample have less than $250,000 taxable income and more than 5 percent have less than $150,000.

Despite these benefits, the data do have some limitations. One of them is whether high-income executives are representative of other high-income people. The results will show that, in fact, executives are much more responsive to taxation than are other high-income people and account for a far disproportionate share of aggregate income changes to taxation. Hence, 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.

A second difficulty is the problem of defining total taxable income. While the 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 capital gains or dividend income, for example.

Slemrod (1994b) has shown, however, that the distribution of income types in the highest income group is bimodal and around one-third of high-income people have 90–100 percent of their taxable income in wages and salaries. The other mode is at 0–10 percent of total income from wages and salaries. Corporate executives are obviously high-salaried individuals, which may imply that other income isn't very important for them. It would certainly be inappropriate to impute the average nonwage income of people in the top bracket. Instead, I will simply assume that their total taxable income is all the taxable income coming from the firm and look at the response of wages and salary; the basic results did not change, however, trying various other levels of nonwage income.[5]

The taxable income coming from the firm is defined to be the sum of salary, bonus, and options exercised in the year, and LTIP payments. LTIP payouts are predominantly, but not always, cash. Sometimes they are shares of stock and therefore 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: some firms report bonuses for the current year but technically pay the bonuses in an adjoining calendar year. This should not affect the estimates of permanent changes but will tend to bias downward the estimated amounts of cross-year shifting.

Nontaxed forms of compensation are reported as "other compensation." This is defined to include anything not included in the other categories; while this is not entirely nontaxable income, in practice it includes mainly perquisites, other personal ben-

[5] Since the most common error will be to misclassify people with low wage and salary income but high unobserved capital income, this should tend to bias downward the estimated tax responsiveness. Later results will show that the cutoff point makes little difference and that the short-run responses are quite large, implying this problem may not be serious.

efits, and premiums paid for split-dollar life insurance policies. By law, firms are required to report perquisites that total more than $50,000 or 10 percent of the executive's annual base salary. In theory, if executives change the form of their compensation in response to taxes, this category should increase when taxes rise. When used, the value of options granted is calculated by the Black-Scholes formula.

The value of exercised options is treated in different ways under the tax code depending on the type of option. Non-Qualified Stock Options (NQOs) are not considered income until exercised, at which time the difference between the stock price on the day of exercise and the option strike price is treated as ordinary income and is deductible for the firm. Further appreciation is treated as capital gains upon sale of the shares. Incentive Stock Options (ISOs) are also not treated as income when granted. ISOs, however, 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 capital gains and is not deductible for the firm. In this paper I assume that all options are NQOs and treat the exercise of options as taxable wage and salary income. I do this because NQOs are the far more common type of option for executives. Annual surveys conducted by the Conference Board (1991, 1992, 1994) show that about 95 percent of stock options grants involve NQOs. Almost three-quarters are exclusively NQOs; NQOs are the tax-advantaged form of option in most cases.[6]

With these components making up the definition of taxable 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 of more than 25 percent, from .31 to .396. The sample choice must be done before the new tax, however, because some people will reduce their incomes enough to get into the lower bracket and an *ex post* classification will mischaracterize them as being unaffected by the higher marginal rate.

The previous literature has generally chosen people according to their income in a year previous to the tax change. To the extent there is a temporary component to high income, however, mean reversion will be spuriously correlated with the tax increase (this is especially important with the rising use of stock options). For this study, I look at the 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 incomes in excess of $275,000.[7]

Data Description

To put the results on executives in context, the first row of Table 1 shows the total wage and salary income, as reported by the IRS, for various high-income taxpaying groups for 1992 and 1993. The marked decrease in the taxable income of the highest group and the simultaneous increase in the taxable income of the lower group occured pre-

[6] The results will also show that the exercise of options is very responsive to the personal tax rate, further suggesting the use of NQOs. For a discussion of the tax advantages to NQOs relative to ISOs see Scholes and Wolfson (1992).

[7] While income averaging or the choice of cutoffs might introduce error into the classifications which reduce the estimated tax responsiveness, the results will show large responses and will be driven by the top of the income distribution. As a consequence, the results were identical using different cutoff levels or redefining permanent income as the average compensation over the sample of both taxable and nontaxable form which includes the value of options granted in place of options exercised. The results below clarify the source of the robustness.

TABLE 1:

Total Taxable Income 1992–1994 (in billions of dollars)

	Number of Returns	*1990 Income*	*1991 Income*	*1992 Income*	*1993 Income*	*1994 Income*	*Income Change*
Taxable Income							
$50,000–200,000	19,581,200	—	—	1,142.7	1,190.5	—	47.80
$200,000+	993,000	—	—	245.7	237.4	—	-8.27
Executives							
Fiscal year							
January – May	611	0.53	0.68	0.57	—	—	-0.11
December	4,103	—	3.31	3.95	3.52	—	-0.43
June – November	1,399	—	—	0.99	1.53	1.10	-0.43
Total	6,133						0.97

Source: Taxable income from Statistics of Income; number of returns are for 1993. Data on executives from my calculations as described in the text of this paper.

cisely when tax rates rose at the top. This is the key fact driving the NTR results of Feldstein and Feenberg (1992): there is an $8.2 billion decrease in real wage and salary income for high-income taxpayers despite a growing economy. It is this striking fact, almost certainly tax-motivated, that must be explained.

The next three rows of Table 1 repeat this exercise with the total income for various executives. The middle of the three rows corresponds to executives from firms using December fiscal years and having data for total compensation in 1992 and 1993. These are executives whose fiscal years correspond with the tax year and 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 approximately the top one million taxpayers fell by $8.2 billion and the fall in taxable income for the 4,103 executives examined in the middle row accounts for about 5 percent of the entire aggregate change.

The other two rows divide the executives into groups. The first group comes from firms with fiscal years ending from January 1 to May 31 and the other from May 31 to November 31.[8] By doing this, I can use the financial reporting conventions of EXECUCOMP to show an important and highly suggestive point about the timing of income. For the first group, any extra income received in late calendar year 1992—from the exercise of stock options, for example—would appear, by reporting convention, in the year labeled 1991 rather than 1992. Likewise, for the firms with fiscal years June through November, 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

[8] 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 the year by the number of executives in the tax change year. The earliest year is simply meant to show that incomes were not falling over the entire range.

otherwise identical executives should move in a staggered fashion. The rows in the bottom half of Table 1 show that there is clear evidence that income rises and then falls with exactly the pattern predicted.

Attributing the combined income drops to the tax change, although there are only 6,133 executives in the data—around .6 percent of the high income taxpayers listed above—their change in total taxable income accounts for almost 12 percent of the aggregate drop in taxable income of the top million taxpayers. There are 4,636 more executives not included in Table 1 because of missing data for some types of income or some years. If their responses are similar, the 10,769 executives at the 1500 S&P index companies in EXECUCOMP make 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 31st of 1992 and zero in 1993, accounts for more than 2 percent of the aggregate change. The top five executives at a single 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 ten times smaller in the short run. 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 also puts an upper bound to the response of other high income people.

Following on the previous evidence that suggested there might be a spike in income in late 1992, the main results of this paper are readily apparent looking at the raw data on taxable income of executives with permanent incomes greater than $275,000 from 1991 to 1995 in Table 2.[9] Average taxable income dropped significantly from 1992 to 1993, falling by $179,000, almost 16 percent. Looking more broadly at 1991–95, however, we see that this followed a tremendous rise of 27 percent ($242,000) from 1991 to 1992 and that the 1993 drop is not sustained.

Broken out into component parts, average salary did not fall in 1993, the growth of nontaxable forms of income did not rise by nearly enough to explain the drop in taxable income, bonus payments actually rose, and the value of options granted also moved the wrong way (they are not currently taxable so should rise with the tax rate). The raw data show clearly that the change to taxable income in response to taxation is comprised of a substantial increase in the exercising of options in 1992 followed by a dramatic decrease in 1993—highly suggestive of a simple timing shift.

This shifting was well noted in public discussions 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 many factors and a variety of specifications but the conclusions are already clear. The changes to taxable income resulted from changes to the timing of compensation, not the form of compensation, and

[9] These are executives from the standard sample meaning 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.

TABLE 2:

Average Compensation by Type for High-Income Executives (in thousands of dollars)

	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
Options Exercised	268	496	293	235	381
Options Granted	—	510	312	379	484
LTIP Payout	57	72	57	64	89
Other	36	37	66	54	78

Source: My calculations for executives with permanent incomes greater than $275,000 per year.

the reports of long-run effects of "The Big Flush" may be greatly exaggerated.

EMPIRICAL STRATEGY

The conclusions about the responsiveness of income to marginal tax rates center on regressions explaining total taxable income. The regressions differ from "natural experiments" by allowing for dynamic responses to tax changes as opposed to before/after comparisons. Individuals can both anticipate as well as react to tax rates. If short-run timing changes are important, future tax increases should increase current taxable income and current taxes should reduce it. The nontransitory elasticity will be smaller than the short-run elasticity and the changes will be concentrated in forms of compensation that are easy to retime such as the exercising options.[10] If, instead, the NTR literature is correct, and the changes in taxable income are permanent shifts of compensation out of taxable form, the long-run elasticity will be greater than the short-run elasticity and changes will be appear as decreases in taxable forms of income and increases in nontaxable forms.

The paper will present several types of specifications because the data on compensation are notably heterogeneous. The analysis of total taxable income can be performed in a familiar log regression form yielding a constant elasticity of taxable income with respect to the net of tax share. For many forms of compensation, however, this procedure does not work because in a given year many executives report no income in such categories as nontaxable perquisites, LTIP payouts, and the exercising of options.

The overall levels of compensation are also quite heterogeneous across individuals. To deal with such problems, the paper will use a variety of methods including linear

[10] I use the term *long-run* or *permanent* elasticity in this paper only to contrast it with the temporary effects usually estimated in the NTR. A better description might be *multi-year* or *nontransitory* elasticity. Estimating a true long-run elasticity from these data or any other data would be seriously complicated by the transitory nature of tax changes in the last 30 years as well as many other factors.

fixed effect regressions, first difference regressions, and sample restrictions. It will also use difference-in-difference 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, and the firm and its financial performance. Because the companies are known, these data allow for much better controls on the economic environment the individual faces than tax return data do. The controls mean that the regressions test whether taxable compensation is lower when tax rates rise than company performance and other factors would predict. In choosing nontax factors that influence executive pay, the paper generally follows the standard executive compensation literature.[11] Various results control for the market value of the company, corporate earnings, rates of return and time trends. In some specifications, cross-sectional variation in the tax rate will allow the regressions to include year dummies and identify the tax responsiveness using difference-in-differences.

Results

Total Taxable Income: Permanent Versus Temporary Effects

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 Table 3 presents an extremely simple regression for executives with real permanent incomes 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 and the ratio of firm earnings to the book value of assets and also includes the log of the net of corporate tax share for executives estimated to face the nondeductibility of executive compensation constraint.[12] The results are clear. The elasticity of taxable income with respect to the current net of tax share still exceeds 1, just as in Column 1. This is, however, not a behavioral response. The large drop in the year of the tax change follows an equally dramatic increase in the year before the 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 over the period 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

[11] For discussions of the issues in this literature see Rosen (1992) or Hall and Liebman (1997).

[12] 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.

TABLE 3:

Response of Taxable Income

First Difference	*(1) No*	*(2) No*	*(3) Yes*	*(4) No*	*(5) No*	*(6) Yes*
ln (1- tax_t)	1.288	1.159	1.224	.873	1.152	1.427
	(.126)	(.119)	(.107)	(.324)	(.316)	(.338)
ln (1- tax_{t+1})		-.763	-.887		-1.325	-1.356
		(.106)	(.118)		(.350)	(.385)
[I>0]*ln (1- tax_c)		.282	.123		.322	.189
		(.140)	(.198)		(.133)	(.187)
ln (Mkt Value)		.610	.261		.212	.094
		(.014)	(.010)		(.022)	(.017)
Earnings/Assets		.510	.191		.132	-.048
		(.056)	(.062)		(.120)	(.128)
Time	.169	.077	.084		—	—
	(.007)	(.008)	(.009)			
Top-bracket-time				.055	-.008	.008
				(.010)	(.010)	(.015)
Top-bracket-(mkt val)					.408	.174
					(.025)	(.019)
Top-bracket-earnings					.345	.202
					(.131)	(.140)
Year Dummies	No	No	No	Yes	Yes	Yes
n	16895	16477	11493	21807	21299	14429
R^2	.73	.77	.07	.82	.84	.07

*Notes: The sample in each regression is 1991–1995. The dependent variable is either the log of taxable income or the first difference of log taxable income as listed at the top of the column. Columns 1–3 look at executives with permanent incomes greater than $275,000 per year. Columns 4–6 look at all executives. All regressions in levels include individual fixed effects. The term [I>0]*ln (1- tax_c) 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 columns 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 the executive has a permanent income greater than $275,000. Standard errors are in parentheses.*

(see Woodlock and Antenucci, 1997). The other control variables have the expected signs. Column 3 repeats the analysis but in first differences and the results are almost identical.

Column 4 repeats the simple regression of Column 1 but includes year dummies and identifies the taxable income response using the cross-sectional variation in marginal rates. This is exactly the regression counterpart of the "natural experiment" literature. Doing this regression explicitly controls for unobserved factors affecting compensation by assuming that they are the same for all executives and that very high-income executives would have had the same income growth as moderately high-income executives but for the differences in taxes. The elasticity of taxable income is, at almost .9, quite high and not significantly different from 1, just as in the NTR literature. Once I allow for timing shifts, however, and fully control for the other variables, as shown in a levels regression in Column 5 or in first differences in Column 6, it is once again clearly apparent that the large estimated elasticity is a transitory phenomenon, not a behavioral response.[13] The short-run elasticity in Column 6 is 1.43 but the permanent elasticity is .07—twenty 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.

Total Taxable Income: Who Responds?

The result that the changes to taxable income are primarily temporary raises questions as to which executives are most responsible for the change. Slemrod (1994) and Goolsbee (1997) have argued that the technology of tax avoidance varies by income level. If true, then short-run income responses may vary significantly by income level even while the underlying long-run responses may be similar. Columns 2–4 of Table 4 show regressions for total taxable income looking at the highest income group but dividing the executives into groups with permanent incomes between $275,000 and $500,000 per year, $500,000 and $1,000,000 per year, and $1,000,000 and greater per year. They are comparable to the results using the full sample repeated in Column 1.

The results show that the short-run tax responses are concentrated at the 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 permanent elasticities, however, are very similar—ranging from .35 to .55—and not significantly different from each other or from zero. Basically the bottom group of high-income executives has virtually no anticipation of the rate increases (the elasticity with respect to next year's net of tax share is only .05) whereas the top group has a dramatic anticipation (the same elasticity is 1.66) indicating that the very rich can more effectively shift their money in the short run than those lower down. In the long run, however, the responses are about the same (and small). These results also clarify why the classification of individuals above or below the $275,000 permanent income cutoff does not matter for the results.

[13] 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 with "natural experiment" methods as described in Goolsbee (1997).

TABLE 4:

Response of Taxable Income for Various Groups

	(1) >275	(2) 275-500	(3) 500-1000	(4) >1000	(5) Options: No	(6) Options: Yes	(7) Salary & Bonus
ln (1- tax $_t$)	1.159	.394	.810	2.218	.290	1.289	.150
	(.119)	(.139)	(.178)	(.281)	(.311)	(.128)	(.073)
ln (1- tax $_{t+1}$)	-.763	-.051	-.433	-1.663	-.181	-.853	-.060
	(.106)	(.132)	(.158)	(.240)	(.279)	(.115)	(.065)
[I>0]*ln (1- tax$_c$)	.282	—	.851	.140	.943	.175	.187
	(.140)		(.639)	(.189)	(.344)	(.153)	(.094)
ln (Mkt 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
n	16477	5918	5680	4879	2122	14330	18628
R^2	.77	.41	.41	.58	.76	.77	.85

*Notes: The sample in each regression is 1991–1995. The dependent variable is the log of taxable income. Columns 1–4 look at executives with permanent incomes in the range listed at the top of the column. Columns 5–6 look at executives divided by whether or not they received any options from 1992 to 1995 as indicated at the top of the column. Column 7 looks at taxable income without options exercised. All regressions include individual fixed effects. The term [I>0]*ln (1- tax$_c$) gives the net of corporate tax share for individuals with more than $1 million in salary in a year previous to the nondeductibility rule. Standard errors are in parentheses.*

Regardless of the cutoff level chosen or whether the lower groups receive a bit more nonwage income than the results assume, the tax response is concentrated in the highest group where classification is not an issue.

The earlier data summary suggested that the exercising of options might be the mechanism behind the temporary shift. Columns 5 and 6 shows the responsiveness of total taxable income for executives who receive no stock options in the sample (Column 6) versus executives who do receive stock options (Column 7).[14] The only response of taxable income comes from executives who receive stock options and that response is transitory, rising the year before a tax increase and falling the year of it. For executives

[14] The distinction is based on the average Black-Scholes value of options granted to the executive over the sample but the data begin in 1992.

who do not receive stock options, there is no significant impact of marginal rates on taxable income. Interestingly, the impact of the nondeductibility of compensation rule is much more important for executives without stock options. For executives without stock options, the loss of deductibility significantly reduces compensation and by a large amount. For executives with stock options, however, the nondeductibility provision has no significant effect. Options may act 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 but only at their taxable income excluding the value of options exercised. This modified taxable income is composed entirely of "normal" types of wage income, namely salary and bonus (regular bonus and LTIP payouts). 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. Taxes have almost no impact on taxable income other than stock options.[15]

Taxable Income Disaggregated by Form of Compensation: Show Me The Money

The evidence using total taxable income is quite clear 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, the results in Table 5 look individually at the tax responsiveness of the various components of total compensation. It is important to note that not every category of compensation is created equal in terms of explaining the overall variations in taxable income, no matter what the elasticities. Salary and bonus for the average executive account for 60 percent of taxable income, exercised options about 33 percent, and LTIP payouts about 7 percent. Nontaxed income is not included in taxable income but, on average, is about 15 percent smaller than LTIP payouts. Even a large tax elasticity for nontaxed income or LTIP payouts will not imply a large absolute effect on total income.

The disaggregated data have a large number of zeros for many forms of compensation so the regressions cannot look at standard log regressions. Instead, the columns of Table 5 look at the first difference of income in absolute levels. The magnitudes are, therefore, susceptible to outliers but the qualitative results are highly robust even though the precise coefficients are not.

Column 1 shows 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 the tax increase and a subsequent drop in the year of the tax change. Evaluating the tax change from 1992–93, the coefficients imply that the 14 percent decrease in net of tax share in 1993 raised taxable income in 1992 by $252,000 and low-

[15] Huddart (1997) provides interesting evidence on the option exercise decision surrounding the tax increase of 1993 for all option holders at four companies showing that taxes seem to matter for the exercise decision.

TABLE 5:

Responsiveness of Alternate Forms of Pay

	(1) TI	*(2) Cash*	*(3) LTIP*	*(4) Non Tax*	*(5) Options Ex.*
ln (1- tax_t)	3314	-41	227	-78	3141
	(348)	(69)	(71)	(67)	(326)
ln (1- tax_{t+1})	-1797	-115	-7	248	-1598
	(384)	(75)	(77)	(94)	(361)
[I>0]*ln (1-tax_{corp})	1305	4	-334	60	1670
	(645)	(138)	(140)	(128)	(605)
ln (Mkt Value)	328	56	13	5	247
	(32)	(6)	(6)	(6)	(30)
Earnings/Mkt	-203	80	-35	14	-276
	(202)	(41)	(42)	(40)	(190)
Constant	157	44	18	20	106
	(30)	(6)	(6)	(6)	(28)
n	11493	13717	13720	12215	11494
R^2	.02	.01	.01	.01	.02

Notes: The sample is 1991–1995. The dependent variable is the first difference of real compensation of the form listed at the top of the column. Each of the regressions is for executives with permanent incomes greater than $275,000 per year. A constant term indicates the presence of a time trend. Standard errors in parentheses.

ered it by $463,000 in 1993.[16]

Column 2 looks at the regression for the salary and bonus component alone. There is no evidence that this accounts for the change in taxable income. There is a small increase in cash compensation in the year preceding the tax change, about $23,000, which is not significantly different from zero and no decrease when taxes rise. Separating salary and bonus yields the same small effects on each.

Column 3 looks at LTIP payouts and shows some responsiveness to current taxes. The magnitude, however (about $32,000 from 1992 to 1993), cannot explain the $463,000 drop in taxable income. 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 ef-

[16] Removing the effect of the largest outliers by using median regression yields a $50,000 increase and $100,000 decrease. The results that follow do not use median regression because several of the forms of compensation have a median of zero and also because the large outliers are themselves an important part of the aggregate changes in taxable income.

fect, which even has the reverse sign in the long-run, demonstrates that it is highly unlikely that taxable income fell because of shifts out of taxable and into nontaxed compensation as claimed in the NTR literature (see Feldstein, 1995b), and simply confirms what could be determined by looking at the magnitudes in Column 1: it is hard to imagine how an executive would reduce taxable income by $463,000 and replace it with an equivalent nontaxed perquisite. Finding such a perquisite which would not need to be reported in the executive compensation data given to the SEC is even less likely.

Column 5, which examines the change in the value of options exercised, shows that the disaggregated data are fully consistent with the results in previous tables. Virtually all of the change in taxable income for high-income executives is short-run change in the exercising of options. The coefficients indicate that options can explain between 90 and 95 percent of the increase of taxable income in the year preceding the tax change and the decrease of taxable income in the year of the tax change.

Deadweight Loss

The data show that the short-run elasticity of taxable income is high. The true deadweight loss of a tax increase, however, depends on the nontransitory elasticity of taxable income which the data here show to be much smaller. As a result, the deadweight loss estimated in the NTR literature for the Clinton tax increase may be significantly overstated. Feldstein and Feenberg (1996) make a deadweight loss calculation using their estimate of the elasticity of taxable income (about two-thirds). They find the deadweight loss to be greater than $15 billion—almost twice the estimated revenue generated by the tax. Their elasticity is a short-run measure, however, based on income from 1992 to 1993. The temporary elasticity estimated here is even larger and would therefore imply an even larger deadweight loss. A more correct measure of the deadweight loss, however, would use the nontransitory elasticity of taxable income.

Feldstein (1995b) has shown that the deadweight loss from higher taxation can be computed according to

$$\Delta DWL = 1/2\varepsilon_{TI}[(t_2^2-t_1^2) / (1-t_1)]TI,$$

where TI is taxable income and ε is the compensated elasticity of taxable income with respect to the net of tax share. This elasticity is related to the uncompensated elasticity estimated in the regressions above according to

$$\eta_{TI} = \varepsilon_{TI} + (1-t)[dt_a / d(1-t)](dTI / dy),$$

where t_a is the average tax rate.[17]

Using the one-year change for the executives here, the uncompensated elasticity,

[17] If we assume a constant elasticity of taxable income with respect to the net of tax share, it is not necessary to know the substitutability of taxable versus nontaxable income in the utility function because people are not currently at a corner solution—they still take salary despite the tax disadvantage.

at around 1 or 1.25, is even larger than in Feldstein and Feenberg. Taking out the temporary shifts, however, the permanent elasticity is usually between 0 and .3. Rather than compute the second part of the right hand side of equation (2) for each individual I simply use the weighted average value from Feldstein and Feenberg of .08. Feldstein and Feenberg find a compensated elasticity of .74, whereas here the *nontransitory* compensated elasticity is between .1 and .4 (and not significantly different from zero in most cases).

To illustrate the difference for deadweight loss, consider an executive in the highest income group—a person earning the mean taxable income of $1,072,000. The tax bill raised the top marginal rate from .31 to .396 for incomes over $250,000. Before the new tax is announced, the executive earns $822,000 more than the $250,000 cutoff and pays $255,000 in taxes on that money. In 1993, when the rate increases, with no behavioral response, total income would not change and revenue on income above the cutoff would rise by $71,000 and generate no deadweight loss. The elasticity of Feldstein and Feenberg implies that taxable income falls to $973,000 so tax revenue rises only $31,000 and the deadweight loss (from equation 1) is $35,000—115 percent of the generated tax revenue. Using the temporary elasticity estimated in this paper of 1.25 would imply that taxable income falls by almost $188,000 in response to the tax change, leading revenues to *decrease* by $3,000 and creating a deadweight loss of almost $50,000.

When I use the more permanent elasticity, however—estimated to range from .1 to .4—taxable income falls only modestly in response to the tax change. Tax revenue increases range from $53,000 to $64,000 and the deadweight loss from (1) ranges from $9,000–$18,000. With the better measure, the deadweight loss of the tax is between 17 percent and 28 percent of tax revenue. This calculation shows that using elasticities such as those in the NTR literature without regard for temporary shifting can lead estimates of deadweight loss to be up to five times too high and give the wrong sign on the revenue response.

CONCLUSION

While there is substantial interest in the subject of how marginal tax rates affect taxable income, a lack of appropriate data has hindered our understanding of the subject. This paper has used detailed data on the compensation of several thousand corporate executives to show that almost all of the responsiveness of taxable wage and salary income to marginal rates from 1991–95 was the result not of behavioral changes but rather of shifts in the timing of compensation, in the spirit of Slemrod (1995).

These few thousand executives account for as much as 21 percent of the aggregate decline in wage income of the top one million taxpayers. Their 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 who have stock options. There is virtually no response of taxable income outside of exercised stock options and the disaggregated data verify that the vast majority of the changes in taxable income come from variations in the timing of option exercising and, to a lesser extent, timing of LTIP payouts. Salary and bonus do not fall in response to changes in marginal rates. There is some evidence of an increase in nontaxable forms of income but the magnitude is nowhere nearly large enough to explain the drop in taxable income from 1992 to 1993.

Using more detailed estimates, it is clear that taxing the rich can lead to dramatic shifting of taxable income in the years immediately surrounding a tax change. Tax changes may allow many to avoid taxation for a short period of time. Once the dust settles, however, the total reduction in their taxable income may be modest and the deadweight loss of progressivity not nearly as large as claimed by the existing literature.

BIBLIOGRAPHY

Auerbach, A. and J. Slemrod (1997), "The Economic Effects of the Tax Reform Act of 1986," in *Journal of Economic Literature*, 35(2): pp. 589–632.

Auten, G. and R. Carroll (1995), "Behavior of the Affluent and the 1986 Tax Reform Act," in *Proceedings of the 87th Annual Conference on Taxation of the National Tax Association*, Columbus, Ohio: pp. 7–12.

Auten, G. and R. Carroll (1997), "The Effect of Income Taxes on Household Behavior," mimeo, Office of Tax Analysis, U.S. Department of the Treasury.

Auten, G. and C. Clotfelter (1982), "Permanent Versus Transitory Tax Effects and the Realization of Capital Gains," in *Quarterly Journal of Economics*, 97(4): pp. 613–32.

Burman, L. and W. Randolph (1994), "Measuring Permanent Responses to Capital-Gains Tax Changes in Panel Data," in *American Economic Review*, 84(4): pp. 794–809.

Carroll, R. (1997), "Taxes and Household Behavior: New Evidence from the 1993 Tax Act," mimeo, Office of Tax Analysis, U.S. Department of the Treasury.

Conference Board, *Top Executive Compensation*, various years. Conference Board, New York.

Eissa, N. (1996), "Tax Reforms and Labor Supply," in *Tax Policy and the Economy*, v.10, J. Poterba, ed., pp. 119–51. Cambridge, Mass.: MIT Press.

Feenberg, D. and J. Poterba (1993), "Income Inequality and the Incomes of Very High Income Taxpayers," in *Tax Policy and the Economy*, v. 7, J. Poterba, ed., pp. 145–77. Cambridge, Mass.: MIT Press.

Feldstein, M. (1995a), "The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1986 Tax Reform Act," in *Journal of Political Economy*, June 103(3): pp. 551–72.

Feldstein, M. (1995b), "Tax Avoidance and the Deadweight Loss of the Income Tax," NBER Working Paper #5055.

Feldstein, M. (1996), "How Big Should Government Be?" NBER Working Paper #5868.

Feldstein, M. and D. Feenberg (1996), "The Effect of Increased Tax Rates on Taxable Income and Economic Efficiency: A Preliminary Analysis of the 1993 Tax Rate Increases," in *Tax Policy and the Economy,* v. 10, J. Poterba, ed., pp. 89–117. Cambridge, Mass.: MIT Press.

Goolsbee, A. (1997), "It's Not About the Money: Why Natural Experiments Don't Work on the Rich," forthcoming in *Does Atlas Shrug? The Economic Consequences of Taxing the Rich*, J. Slemrod, ed. Cambridge: Cambridge University Press.

Gordon, R. and J. Slemrod (1997), "Are Real Responses to Taxes Simply Income-Shifting Between Corporate and Personal Tax Bases?" forthcoming in *Does Atlas Shrug? The Economic Consequences of Taxing the Rich*, J. Slemrod, ed. Cambridge: Cambridge University Press.

Hall, B. and J. Liebman (1997), "Are CEOs Really Paid Like Bureaucrats?" mimeo, Harvard University.

Heckman, J. (1993), "What Has Been Learned About Labor Supply in the Past Twenty Years?" in *American Economic Review,* 83(2): pp. 116–21.

Heckman, J. (1996), "Comment on Eissa," in *Empirical Foundations of Household Taxation*, M. Feldstein and J. Poterba, eds., pp. 32–38. Chicago: University of Chicago.

Huddart, S. (1997), "Tax Planning and the Exercise of Employee Stock Options," mimeo, Fuqua School of Business.

Katz, L. and K. Murphy (1992), "Changes in Relative Wages, 1963–1987: Supply and Demand Factors," in *Quarterly Journal of Economics,* 107(1): pp. 35–78.

Levy, F. and R. Murnane (1992), "U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations," in *Journal of Economic Literature*, 30: pp. 1333–81.

Lindsey, L. (1987), "Individual Taxpayer Response to Tax Cuts: 1982–1984, with Implications for the Revenue-Maximizing Tax Rate," in *Journal of Public Economics,* 33: pp. 173–206.

Macurdy, T. (1992), "Work Disincentive Effects of Taxes: A Re-examination of Some Evidence," in *American Economic Review,* 82(2): pp. 243–49.

Parcell, A. (1996), "Income-Shifting in Response to Higher Tax Rates: The Effects of OBRA 93," mimeo, Office of Tax Analysis, U. S. Department of the Treasury, presented at ASSA meetings, San Francisco, 1996.

Pencavel, J. (1986), "Labor Supply of Men: A Survey," in *Handbook of Labor Economics,* Vol. 1, O. Ashenfelter and R. Layard, eds., pp. 3–102. Amsterdam: Elsevier.

Randolph, W. (1995), "Dynamic Income, Progressive Taxes, and the Timing of Charitable Contributions," in *Journal of Political Economy*, 103(4): pp. 709–38.

Rosen, S. (1992), "Contracts and the Market for Executives," in *Contract Economics*, L. Werin and H. Wijkander, eds., pp. 181-211. Blackwell.

Sammartino, F. and D. Weiner (1997), "Recent Evidence on Taxpayers' Response to the Rate Increases of the 1990's," in *National Tax Journal*, 50(3): pp. 683–705.

Scholes, M. and M. Wolfson (1992), *Taxes and Business Strategy*. Englewood Cliffs, New Jersey: Prentice Hall.

Slemrod, J. (1992), "Do Taxes Matter? Lessons From the 1980's," in *American Economic Review*, 82(2): pp. 250–56.

Slemrod, J. (1994a), "A General Model of the Behavioral Response to Taxation," mimeo, University of Michigan.

Slemrod, J. (1994b), "On the High-Income Laffer Curve," in *Tax Progressivity and Income Inequality,* J. Slemrod, ed., pp. 177–210. Cambridge: Cambridge University Press.

Slemrod, J. (1995), "Income Creation or Income-Shifting? Behavioral Responses to the Tax Reform Act of 1986" in *American Economic Review,* 85(2): pp. 175–80.

Slemrod, J. (1996a), "High-Income Families and the Tax Changes of the 1980s," in *Empirical Foundations of Household Taxation,* M. Feldstein and J. Poterba, eds., pp. 169–89. Chicago: University of Chicago.

Slemrod, J. and S. Yitzhaki (1996), "The Cost of Taxation and the Marginal Efficiency Cost of Funds," in *IMF Staff Papers*, 43(1). Working paper.

Toder, E. (1995), "Comments," mimeo, NBER Conference, November 7, 1995.

Woodlock, P. and J. Antenucci (1997), "Update: Corporate Responses to Executive Compensation Limits," in *Tax Notes*, October 13, 1997, pp. 221–26.

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