Working Paper Series
Congressional Budget Office
Washington, D.C.

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December 2006

CBO Working Paper 2006-14

Trends in High Incomes and Behavioral Responses to Taxation: Evidence from Executive Compensation and Statistics of Income

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Abstract

This paper examines income trends from 1992 to 2004 and the responsiveness of different income measures to tax changes for corporate executives and for the very highest income U.S. taxpayers. We detail the growth in executive compensation and break down the components of that growth by sources, such as the value of options and stock grants, as well as bonus income. We then examine income trends at various points in the income distribution for executives and for all taxpayers. An empirical strategy similar to that employed by Goolsbee (2000) is then used to examine the responsiveness to tax rates of broad measures as well as individual sources of executive compensation. Additionally, we investigate the impact of marginal tax rates applying to corporate income, personal income, and capital gains on the composition of executive compensation.

Consistent with other studies, we find that most of the growth and volatility in incomes has been concentrated within the top one percent of taxpayers, for whom income grew sharply between 1992 and 2000, and then declined sharply from 2000 to 2002. Below the top one percent, income patterns are much more stable. Income patterns for executives are similar to, but more volatile than, those for the very highest income taxpayers. Salary income of executives has been relatively stable, while the value of their stock options, stock grants, and bonuses has grown tremendously.

We use data from two sources: a panel of executives and IRS tax returns from the Statistics of Income. Our elasticity estimates based on the panel of executives may be more reliable than those based on the tax panel because the regressions include firm-specific information that helps to explain changes in income. For executives, our permanent earned income elasticity estimate for the early 1990s is 0.19 (with substantial transitory shifting of income into the year prior to the 1993 tax increase). There is also evidence of substantial transitory income shifting around the time of the 2001 Economic Growth Tax Relief and Reconciliation Act (EGTRRA), but the overall estimated elasticity is negative. The results are not definitive, however. Our results are sensitive to many factors, such as the time-period examined, the data set used, and the econometric specification. That inconsistency reflects the complexities inherent in estimating high-income behavioral responses to taxation. The fact that the elasticity estimates differ greatly across time-periods and across the two datasets suggests that non-tax factors are extremely important. That observation is consistent with several other papers (Slemrod 1996, Saez 2004, Kopczuk 2005, Giertz 2006) that all show a great deal of sensitivity surrounding taxable income elasticity estimates.

* The authors wish to thank David Weiner, Ed Harris, Bob Williams, Larry Ozanne, John Sabelhaus, and Bob Dennis for comments and for assistance with the data construction. Nicola Lostumbo provided excellent research assistance.

1. Introduction

This paper examines recent income trends and behavioral responses to tax changes for some of the very highest income U.S. taxpayers. As other researchers have found, taxpayers at the top of the income distribution account for a large and growing share of overall income and an even larger share of federal tax revenues. The share of total income accruing to the top one percent of the distribution rose by 35 percent (from 9.1 to 12.3 percent) from 1980 to 1992, and by another 16 percent from 1992 to 2003 (despite a 20 percent drop from 2000 to 2003). In terms of tax revenues, the top one percent pays over one-third of all federal income taxes and well over one-fifth of all federal taxes.[1]

Feldstein's (1995) seminal paper led to a shift in research on the efficiency costs of taxation from traditional measures of labor supply (hours worked and participation) to broader measures of labor market behavior, measured by the elasticity of taxable income. That much broader measure of the consequences of taxation encompasses responses resulting from changes not just in hours worked, but also responses along other margins, including changes in work effort, human capital accumulation, and the shifting of income both intertemporally and, within a time-period, between different bases. The marginal efficiency cost of taxation and excess burden can be calculated directly from the elasticity of taxable income (Feldstein 1999).[2]

High-income tax filers may be more responsive to taxes than other income groups because they have more margins through which they can respond than do more modestly paid workers (who often rely primarily on wage and salary income). Taxable income responses can take various forms, including *real responses* (labor supply and entrepreneurial effort), *income shifting*, and *tax avoidance or evasion*. Income shifting can occur across sources of income subject to different tax treatment; some categories of income are subject to different tax rates, while others may be outside the tax base entirely. Additionally, the use of tax deductions and exemptions may be responsive to taxes. Income shifting can also take place across time periods by altering the timing of deductions

[1] Congressional Budget Office, "Historical Effective Federal Tax Rates: 1979 to 2003," December 2005. Those estimates are somewhat different from those reported by Piketty and Saez (2003) and in section 2 of this paper due to slight differences both in how the top one percent is defined and the definition of income.

[2] The elasticity of taxable income can be expressed as $\left(\frac{dTaxableIncome}{d(1-MTR)}\right)\cdot\left(\frac{1-MTR}{TaxableIncome}\right)$.

or income received through, for example, bonuses or the exercise of options. While high-income taxpayers generally have more fungible sources of income, allowing them to more easily shift income across categories and time-periods, their real responses (hours worked or work effort) may be more sensitive to taxes because their wealth cushions the impact on their standard of living.

This paper examines behavioral responses of both executives and other high-income taxpayers to changes in tax rates. In examining the responses of executives, we use data from Standard & Poor's Executive Compensation Database (ExecuComp). Interest in increasing the transparency of executive pay has grown recently in the wake of corporate accounting scandals and the large growth in executive compensation. The Securities and Exchange Commission has passed more stringent rules, set to take effect in 2007, for the reporting of executive compensation. Apart from the issue of transparency, data on the level and composition of executive pay allow for a direct evaluation of several potential tax responses, along margins that are not observable with IRS tax data.

Goolsbee (2000) uses ExecuComp data to examine the response of high-income executives to the tax increases of the early 1990s. He generally finds large responses of earned income to changes in the current after-tax share[3] — estimating a taxable-income elasticity often well above one — but small permanent responses. He concludes that the behavioral response of executives to the 1993 tax increase was largely transitory — a temporary shifting of income into the relatively low-tax period. The permanent (or longer-term) elasticity was as low as zero — but ranged as high as 0.40. Hall and Liebman (2000; henceforth, HL) used similar data on CEOs to examine responses to the 1990s tax increases as well as the tax cuts of the 1980s. They also find a small overall response for the tax hikes of the 1990s, but argue that the large transitory response observed by Goolsbee may reflect past option grants and stock appreciation rather than a tax response. HL's results are not definitive, however. Estimates on their key covariates are not consistent with theory — and in some instances, estimates show strong statistical significance although they have the "wrong sign."

Those findings stand in contrast to other empirical evidence on the taxable income elasticity of high-income taxpayers (Giertz, 2004). In particular, Gruber and Saez (2002), Saez (2004), and Giertz (2005) all find much larger responses for very high income tax filers than for the rest of the

[3] The after-tax share equals one minus the marginal tax rate.

distribution. Saez (2004), for example, finds almost no response for the bottom 99 percent of the income distribution, but substantial response at the very top. Notably, those results are based on tax return data from the IRS's Statistics of Income (SOI).

We use ExecuComp data and SOI data on tax returns for years 1992 to 2004 in order to better understand the growth and composition of executive pay as well as the role of tax changes. We first detail the growth in the value of options and stock grants as well as bonus income, then examine income trends at various points in the income distribution (for executives as well as all high-income taxpayers).

To measure transitory and permanent (or long-term) behavioral responses to the tax changes of the 1990s and 2000s, we use both ExecuComp and SOI data to estimate regressions using specifications similar to those used by Goolsbee (2000). We examine the responsiveness of both broad measures (total compensation) and individual sources of executive compensation. Finally, we extend the analysis to evaluate the impact of marginal tax rates applying to corporate income, personal income, and capital gains on the composition of executive compensation (HL 2000). The later regressions are estimated on shares of compensation (such as non-qualified stock options and restricted stock grants).

For executives, we find a permanent earned income elasticity for the early 1990s of 0.19 (including an estimated anticipation effect of -0.63), about half the size of Goolsbee's comparable estimate. For the 2001 tax act, the estimate is negative; the anticipation effect is slightly larger (-0.69), but the current effect is about zero. Restricting the sample to executives with very high incomes (such as those with incomes of $1 million or higher) yields larger estimated responses for the 1990s, but for 2000 to 2004 and for 1992 to 2004 the overall estimated elasticities remain negative (i.e., the "wrong sign"). Those findings are similar to HL (2000), which showed the "wrong sign" for the 1990s and for periods in the 1980s on at least one of the two components used to calculate the net (i.e., permanent) elasticity.

For the SOI, estimates from a simple model yield estimated responses that are much larger than those for the ExecuComp. For the more sophisticated model, the SOI estimates are smaller, but very sensitive to the different time periods and sometimes the signs on the coefficients are not

consistent with theory. In light of that, the SOI results should be viewed as inconclusive, while also suggesting that firm-specific information (available in the ExecuComp, but not the SOI) may be important in identifying responses. The ExecuComp-based results, however, are not definitive because even with firm-specific information the estimates are sensitive to an array of factors and it is likely that the controls are insufficient for a wide range of non-tax factors, including the upward, but volatile, income trend observed at the top of the income distribution over the study period.

2. The Composition of Executive Compensation and the Concentration of Top Incomes

2.1 The Executive Compensation Database.

The ExecuComp database used in this paper tracks CEOs plus the four other highest-paid executives (based on salary and bonus income) at corporations in the Standard and Poor's S&P 500, S&P Mid Cap 400, and S&P Small Cap 600. The data span 1992 to 2004, a period during which taxes were raised and then cut, and during which the stock market boomed and then precipitously declined. The data are compiled by Standard and Poor's from proxy statements and 10-K forms and are part of its Compustat database. The data represent an important subset of the very highest income U.S. taxpayers and have been used to examine the behavioral response of high-income taxpayers to the 1993 tax increase, passed as part of OBRA 93 (Goolsbee 2000, and HL 2000).

The advantages and limitations of the ExecuComp data have been discussed elsewhere (Goolsbee 2000), but are useful to review. On the plus side, the data include a large sample of very highly compensated individuals and provide detailed information on their compensation packages (salary, bonus, Long-Term Incentive Plan [LTIP] payouts, options exercised, and other income) both at a point in time and over time. In addition, at the end of each fiscal year, the ExecuComp includes each executive's total holding of stock in the corporation as well as stock options. Among the confounding factors in measuring behavioral responses to taxation has been the general inability to control for the firm's financial and accounting performance. The ExecuComp's firm-specific information overcomes that obstacle.

The main drawbacks of the ExecuComp are its lack of both demographic information and information on deductions and exemptions as well as income received from outside the firm, including income of spouses or other family members. In contrast to tax return data, the definition

of the various income sources generally does not change over time, thus, it is not necessary to construct a constant-law measure of income. But the drawback is that the reported incomes make up just one component of overall taxable income. In fact, the main income measure used in this paper (and in much of the literature examining responses of executives to changes in tax rates) is actually a measure of *earned* income, as opposed to the more comprehensive taxable income measure in the tax return data, and even then it is only a partial measure because it misses other members of the tax unit.

In addition to those drawbacks, some have recently questioned the transparency of information from proxy statements filed with the SEC. Reports of large compensation packages paid to some high-profile executives (or former executives) from sources other than the SEC have fueled concern that reporting requirements have too many loopholes.[4] In general, the value of retirement packages (and other post-employment benefits), some perquisites, and tax-gross-ups (where the firm makes additional payments to executives to cover some or all of their tax liabilities) often go unreported to the SEC. In response to the widespread belief that these forms of compensation are excessively large and are used primarily to circumvent SEC reporting rules (and possibly to hide information from shareholders), the SEC has tightened the rules for reporting executive compensation. The new rules, set to take effect in 2007, require corporations to report nearly all forms of executive compensation.

In calculating earned income (before deductions) for executives in the ExecuComp database, we assume that all executives (1) are married and file joint income tax returns, and (2) report no other earned income (e.g., spousal income, income from outside the firm, etc.). *Excluded* income would bias the selection of the sample and the empirical results if it varies across executives by their earned income. For comparison, we employ, as closely as possible, the same sample selection criteria for the SOI data (discussed below).

[4] In one highly-publicized case, former General Electric CEO Jack Welch was reported to have received an annual pension in excess of $9 million dollars. Additionally, his retirement package included a vast array of lavish in-kind benefits, with an estimated annual dollar-value well into the millions. GE was not required to provide that information to the SEC and it only came to light in Welch's divorce proceedings.

For the ExecuComp sample, earned income is defined as the sum of salary, bonus, LTIP payments, and exercised stock options. The non-salary components of income are taxed in different ways.[5] LTIP payments may or may not be taxable, depending on their form. Firms typically reward executives with cash (taxable), but they may also reward executives using shares (non-taxable). The tax treatment of options depends on whether they are nonqualified stock options (NQSO) or incentive stock options (ISO). Both types of options are not taxed (at the individual level) when granted, but receive markedly different tax treatment (from each other) when exercised. At the time of exercise, NQSOs are counted as ordinary income equal to the difference between the stock price on that date and the option strike price. ISOs, on the other hand, are not counted as ordinary income even when exercised; instead, at the time of sale, the difference between the sale price and the option strike price counts as capital gains income. Another important difference is that (at the firm level) NQSOs are deductible against corporate profits, whereas ISOs are not. For the ExecuComp sample, the calculation of earned income assumes that exercised stock options are nonqualified and are thus counted as ordinary income. In fact, 95 percent of options are estimated to be NQSOs (HL 2000).

To focus on taxpayers in the top tax bracket (who faced the most significant changes in tax rates) and to avoid (cross-sectional) endogeneity between income and marginal tax rates, for both of our datasets, we follow Goolsbee by selecting those with permanent (i.e., mean) annual incomes in excess of $376,000 (which is roughly Goolsbee's cutoff when measured in 2004 dollars). Permanent income is calculated by averaging income over an individual's entire tenure in the data.[6] The degree to which permanent income is endogenous to tax rates depends on the nature of the behavioral response. To the extent that behavioral responses are more transitory (i.e., a shifting of income intertemporally as opposed to a persistent change in behavior), permanent income will be less sensitive to taxes than an annual measure. In addition, and also following Goolsbee, we include only executives working for firms with fiscal years ending in December. The resulting sample is composed of 10,179 executives and 58,394 observations. From 1992 to 2004, those executives earned on average $1,928,376 (2004$) in annual income (salary plus bonus, long-term

[5] The issue with bonus income is a technical one regarding the timing of its reporting versus its payout (when it is taxable). Because reporting typically differs by at most one calendar year, any discrepancies may affect estimates of the degree of shifting in income but not the long-term elasticity.

[6] Permanent income is used instead of contemporaneous income so that mean reversion is not a major factor in determining the sample. With contemporaneous income, a transitory component of income could lead to a spurious correlation between income and tax changes, biasing estimated responses.

incentive plan payouts, and exercised options), with half earning more than $789,961 (2004$), see Table 2.1. On average, total compensation (earned income plus restricted stock grants, the Black-Scholes value[7] of unexercised options granted, and other income) for those executives was $2,619,757 (2004$), while the median was $958,916 (2004$).

2.2 The Statistics of Income.

Executives are a select subset of high-income taxpayers and the data do not include all relevant information for tax purposes. For that reason, we also use IRS data covering all taxpayers; the other data are from individual tax returns from the Statistics of Income (SOI) for years 1992 to 2003. The SOI is a stratified random sample of tax filers, compiled by the Internal Revenue Service, and includes most information reported on filers' tax returns, plus additional demographic information. In order to have a sample with a similar income range as our ExecuComp sample, we restrict our SOI sample to taxpayers with mean annual earned income (i.e., reported wage and salary income), greater than $376,000 (2004$) and employ, as closely as possible, the same sample selection criteria used with the ExecuComp. We base our primary income measure on earned income (again primarily wages and salaries) and calculate a full taxable income measure (excluding capital gains). Gross income equals total income before exemptions and deductions (less capital gains and Social Security benefits).[8] The resulting sample, after employing all of the sample restrictions, is composed of 97,336 filers and 314,020 observations.

Over the 12 years of our data, the average annual real wage and salary income (the income measure that is closest to the earned income measure from the ExecuComp) is $2,771,331 (2004$) and the median is $946,203 (2004$), see Table 2.1. For all tax filers with mean earned income above $376,000, earned income makes up about 90 percent of total taxable income (excluding capital gains and after deductions) and about 80 percent of gross income (excluding capital gains).[9]

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[7] The Black-Scholes formula is applied to estimate the market value of derivatives (such as stock options). The values take into account several factors, including the value of the underlying assets, the time remaining on the derivative, and the price volatility of the underlying security.

[8] Specifically, gross income = wages + salaries & tips + interest income + dividends + alimony received + business income (or loss) + IRA distributions + pensions & annuities + Schedule E income + farm iIncome + unemployment income + other income.

[9] Those percentages are based on all filers (with average incomes exceeding $376,000) from 1992 to 2003 and not just those in our sample. Also, unless otherwise stated, all income measures discussed in this paper exclude capital gains.

Two main advantages of the SOI are that it contains actual data reported to the IRS and it heavily oversamples high-income filers. Actual information from tax returns gives a much broader and more accurate measure of taxable income than do measures constructed from the ExecuComp because the former includes wages and salaries earned outside of the corporation, other forms of taxable income besides earned income, income from spouses, and deductions and credits taken by the filer. The fact that the SOI oversamples high-income returns (those at the very top of the income distribution are sampled at a 100 percent rate) results in a large number of high-income filers who are often observed in multiple years. Various years of the SOI have been used to examine behavioral responses to tax changes (Carroll 1998, Auten and Carroll 1999, Giertz 2006).[10]

The main drawbacks of the SOI are that important forms of compensation are either not reported or reported only when realized. Capital gains, for example, are not taxed (or reported) upon accrual, but only when realized, often leading researchers to exclude capital gains when measuring behavioral responses to tax changes. Additionally, with tax data it is often not possible to distinguish between income from options and income from regular earnings. Perquisites, including health benefits, are often tax-preferred and not reported on individual returns. Tax-deferred benefits, such as 401(k) contributions, are another important form of compensation that is not reported on tax forms (until funds are withdrawn). Furthermore, the rules for what must be reported (and the definition of taxable income itself) change periodically, making it difficult to construct a taxable income measure that is consistent over time.

2.3 Basic Findings on the Level and Composition of Executive Compensation.

Executive compensation has grown tremendously in recent decades, and evidence on the growth of CEO compensation from 1980 to 1994 shows an especially large role of stock options (HL 1998).

[10] A subset of the SOI, the Continuous Work History Survey (CWHS), which is composed of a random sample of tax returns, has been used in other studies (such as Gruber and Saez, 2002, and Kopczuk, 2005). While the CWHS has many desirable properties, it does not have a large number of filers from the very top of the income distribution. For example, from 1992 to 2003, the full SOI includes 166,040 returns with salaried income exceeding $1,000,000 (2004$) versus just 1,201 such returns from the CWHS portion of the sample. At salaried incomes of $5,000,000 or greater, the full SOI includes 37,062 returns, while just 261 of those returns are in the CWHS. The behavior of very high income filers is especially important because they are responsible for a relatively large share of total income (and an even larger share of federal tax revenues) and because both theoretical and empirical evidence suggests that their behavior in response to changes in tax rates may be very different from the rest of the income distribution.

This paper shows that the trend (at least since the early 1990s) holds as well for top executives more generally. Average (real) total compensation was 114 percent greater in 2004 than in 1992, rising from an average of $1.2 million in 1992 to $2.7 million in 2004.[11] While salaries were relatively flat, growing a total of only 14 percent, bonuses, stock grants, and the value of options exploded over that time period. The mean bonus grew by 153 percent ($342,000), stock grants by 396 percent ($344,000), and the value of options granted by 145 percent ($541,000) — see Figure 2.1 and Table 2.3. As a share of total compensation, salaries fell by nearly half, from 32 percent in 1992 to 17 percent in 2004, while the value of options granted, stock grants, and bonuses rose from 55 percent to 72 percent of total compensation. (In fact, the value of option grants alone represented nearly 60 percent of total compensation in 2001, before falling sharply.) On top of that, equity holdings by executives have increased greatly, partly as a result of stock grants and exercised stock options. Thus, Hall and Liebman (1998) find that for many executives, changes in stock prices can have an enormous impact on their wealth, far greater than the value of salaries and bonuses.

The sources of compensation that grew fastest also exhibited the greatest volatility. The average value of stock options, now the largest source of compensation, rose by a total 396 percent ($1.4 million) from 1992 to 2000. But, the drop in the stock market in 2000 (and the subsequent recession) resulted in a decline in the average value of options of 49 percent ($866,000) by 2004. Bonuses and stock grants also declined from 2000 to 2001, but started to rebound in 2002. In fact, by 2004 bonuses and stock grants were at all-time highs, average bonuses were 30 percent ($130,000) larger than their previous high and the value of stock grants was 41 percent ($125,000) larger than their previous high. The average value of options granted grew sharply from 2003 to 2004, but their value was still nearly 50 percent ($866,000) lower than at their peak in 2000.

Mean values show no obvious pattern of behavioral responses surrounding the 1993 tax increase and 2001 tax decrease, which may well be masked by the rapid growth and volatility of executive pay. That is especially true for the 2001 Economic Growth Tax Relief and Reconciliation Act (EGTRRA), which includes pieces that phase in and phase out (or expire) over a full decade (ending in 2011), and coincided with a drop in the stock market and a mild recession. Note, however, that the value of *exercised* options fell sharply in 1993 even as total compensation

[11] Numbers are based on the sample of firms with fiscal years ending in December.

continued to rise through the 1993 Omnibus Budget Reconciliation Act (OBRA 93).[12] The average value of exercised options fell from $446,000 in 1992 to $263,000 in 1993 and to $252,000 in 1994. It was not until 1995 that the value of exercised options exceeded its 1992 level. The drop in the value of exercised options, possibly due to non-tax factors, is consistent with intertemporal income shifting. Nonqualified stock options are treated as ordinary income and faced a 28 percent higher top tax rate in 1993 than in 1992 (39.6 percent versus 31 percent).[13] Additionally, executives have a great deal of discretion in exercising their options.

2.4 Comparing the SOI and ExecuComp Data.

Corporate executives are a small but important subset of high-income taxpayers. The full ExecuComp sample represents well less than one-hundredth of one-percent of all taxpayers between 1992 and 2004, and over seven-tenths of a percent of the top one-percent of all income tax filers. They represent a much larger share of the highest-income taxpayers when measured by income, however. Executives in the sample account for as much as $22.3 billion in annual earned income and $28.3 billion in total compensation (for 2000). For 2000, that amounts to 3.6 percent of all reported earned income for the top one percent of tax filers.

The Income Distributions of Executives and High-Income Taxpayers. Two observations emerge from comparing kernel density estimates for executives and for taxpayers in the top one-percent of the overall earned income distribution, see Figure 2.3. First, the modes for the two distributions are similar, but earned income for the tax filers is more tightly compressed: at the mode, the density for tax filers is over 5.5 times the density for executives. Second, the two distributions intersect at roughly $420,000, but a much larger share of the executive sample (as compared to the top one percent of tax filers) has income greater than $420,000. Thus, earned income for executives shows much greater variation than does earned income for the top one percent of taxpayers. While many executives are not in the top one percent of the overall earned income distribution, most are.

[12] The effect of the tax acts (mentioned here) is discussed in more detail in the following section.
[13] For 1994, that top rate was effectively 42.5 percent because of the elimination of the income cap for the portion of the payroll tax used to finance Medicare.

Income for many executives is not only in the top percentile, but well above the 99th percentile. To illustrate that fact, we present gross income for fractiles and percentiles within the top decile of all taxpayers in 1998 as reported by Piketty and Saez (henceforth PS, 2003) as well as comparable numbers from the ExecuComp, see Table 2.2. Executives' gross income includes earned income plus other annual income and restricted stock grants, but does not include the value of unexercised options.[14] In 1998, the taxpayer at the 95th percentile had gross income that would have placed her below the 2nd percentile of executives in the ExecuComp data. The taxpayer at the 99th percentile of the SOI distribution earned $266,778 (2004$) in 1998, placing her at about the 13th percentile of executives. Finally, only 0.01 of one percent of tax returns reported gross incomes greater than $4.2 million (2004$), compared to almost 8.5 percent of ExecuComp executives. The bottom panel of the table presents a slightly different picture of the data. Taxpayers at the 90th to 99th percentiles ($134,175) earned almost one-quarter *less* than the bottom ten percent of ExecuComp executives. On average, the top five percent of executives earned gross income of $17.4 million, over 50 percent more than the top 0.01 percent of the SOI.

IncomeTrends. Income trends (at various percentiles) in the two datasets suggest the degree to which executives are representative of very high-income taxpayers more generally. Comparability of the income trends is important because it speaks to our ability to extrapolate from the behavioral responses of executives to high-income taxpayers more broadly. (Section 4 includes a broader comparison of executives and other high-income tax filers.)

Trends in earned income at various percentiles show that growth in top incomes is concentrated within the top one percent of taxfilers, see Figure 2.2, Table 2.4 and Table 2.5.[15] Income growth and volatility are most striking at the top one-tenth of the 99th percentile (i.e., the 99.9th percentile).[16] The 99th and the 99.5th percentiles have the highest average growth (1.6 percent a year) over the full 13-year period, but in years 1994 to 2000, growth was much stronger for the top tenth of the 99th percentile (averaging 4 percent or $36,967 a year) than at any other point in the distribution. For that latter group (the top one-tenth of one percent), earned income peaked in 2000 and then declined sharply through 2002 before leveling in 2003, falling by an average of over 5 percent or

[14] Numbers are based on the ExecuComp sample with fiscal years ending in December.
[15] Patterns for taxable income (less capital gains and after deductions) and for gross income (less capital gains) are very similar to the patterns for earned income.
[16] The Appendix reinforces those findings by looking at top income shares.

$41,053 a year over that period. That pattern appears to be closely linked to the performance of the stock market; in fact, the S&P 500 follows a similar, albeit more exaggerated, path.[17] Overall, those findings are in sharp contrast to the rest of the income distribution; for example, median real earned income was remarkably stable, increasing on average 0.63 percent ($132) a year.[18]

The ExecuComp data show broadly similar, though much more pronounced, patterns at the very top of the distribution, see Figure 2.4, Table 2.4 and Table 2.5. In addition, earned income at each of the top four deciles of the income distribution declined from 1992 to 1994, then increased sharply through 2000, only to decline again sharply from 2000 to 2002. That pattern is notably not consistent with points in the top decile of the overall distribution.[19]

The rates of change in the earnings of executives at the 90th percentile are roughly twice those of corresponding changes for the top one-tenth of the 99th percentile of *all* taxpayers. At the 95th percentile of the ExecuComp data the pattern is even more exaggerated, with earned income falling at an average of 7.4 percent ($274,975) per year from 1992 to 1994, increasing by an average of 29.3 percent ($849,156) per year from 1994 to 2000, and then falling again by 16.4 percent ($1,450,303) a year from 2000 to 2002. The S&P 500 index followed a very similar trend over this same period, see Figure 2.4.

The reasons behind the volatility in executive earnings in the top decile of their distribution (relative to all taxpayers) are not obvious, though several factors are likely important. First, executive incomes may be more volatile by their very nature than the incomes of non-executives; for example, executive income may be more cyclical, as suggested by the comparison between the top income groups from the ExecuComp and the S&P 500 index. Second, the ExecuComp data represent a narrow picture of high-income taxpayers, raising the possibility that some of the volatility is just noise. Finally, earned income measures in the two samples differ: the SOI

[17] The S&P 500 has been converted to real dollars by the CPI and then superimposed over the other income trends for comparison. The actual measure of the S&P 500 is not listed on either axis.
[18] By comparison, and illustrative of the sharp income growth at the top of the distribution, mean income, plotted against the right-hand axis, is on average 63 percent, or $13,682, greater than median income and the mean grows at about a 50 percent greater rate than the median (0.91 percent versus 0.63 percent) from 1992 to 2003.
[19] A difference between the ExecuComp and the overall distribution of tax returns is that from 2002 to 2003, income at points in the overall distribution was generally flat, while for the ExecuComp, earned income increased, often sharply, between 2002 and 2004.

measure includes income earned outside the firm as well as spousal income, and so may be inherently more stable.

3. Tax Changes and Estimation Strategy

3.1 Federal Income Tax Changes, 1992 to 2004

To identify the impact of tax rate changes on the level and composition of high-income taxpayers compensation, this paper uses the variation in both federal and state income tax rates from 1992 to 2004. During that period, a series of federal tax acts − OBRA 93, the Taxpayer Relief Act of 1997 (TRA 97), EGTRRA, and the 2003 Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) − first raised and then lowered the marginal tax rate at the top of the income distribution, see Table 3.1 and Figure 3.1. OBRA 93 raised the marginal income tax rate for married (joint) tax filers in the top bracket (with taxable income of more than $250,000) from 31 percent to 39.6 percent, and in the next bracket (with incomes between $140,000 and $250,000) from 31 percent to 36 percent. OBRA 93 also eliminated the cap on income that is subject to the Medicare component of the payroll tax ($135,000 in 1993), effectively raising the marginal tax rate on those taxpayers by an additional 2.9 percentage points starting in 1994.[20] Finally, included in OBRA 93 was Section 162(m) of the Internal Revenue Code ("million-dollar rule"), which put a $1 million limit on the deductibility (against corporate profits) of non-performance-based compensation of the CEO and other four most highly compensated executives. In addition to introducing new vehicles for deferring taxation on certain types of savings, TRA 97 lowered long-term capital gains tax rates and offered large exclusions for capital gains resulting from home sales.

The 2001 and 2003 tax cuts included provisions that phase in and expire at different times.[21] The top rate declines from 39.6 percent in 2000 to an eventual level of 35 percent. The 36, 31, and 28 percent brackets ultimately fall by 3 percentage points each. Those reductions were scheduled to be gradual under the 2001 act: all four rates were reduced by 0.5 percentage points on July 1, 2001, and January 1, 2002, and were scheduled to be reduced by an additional percentage point at the

[20] Effective marginal tax rates can be higher because of phaseouts of up to 100 percent of personal exemptions (PEP) and up to 80 percent of itemized deductions (Pease). However, most of the taxpayers in our samples are beyond the phaseout range and thus not affected on the margin.

[21] The 2001 and 2003 tax acts are discussed in detail by Gale and Orszag (2004).

beginning of 2004. At the beginning of 2006, the top rate was scheduled to fall by 2.6 percentage points, while the next three rates were scheduled to fall by 1 percentage point. The 2003 tax cut accelerated the reductions scheduled for 2004 and 2006 to the beginning of 2003. The reduced rates are in effect through 2010.

In 2003, JGTRRA reduced tax rates on dividends and capital gains. Tax rates on realized long-term capital gains received by individual shareholders were reduced from 10 percent (in brackets where the ordinary income tax rate was 15 percent or below) and 20 percent (in brackets where the ordinary income tax was higher than 15 percent) to 5 percent and 15 percent, respectively, through 2007 and to zero and 15 percent in 2008. Tax rates on qualified dividends received by individual shareholders were reduced from the rates that apply to ordinary income to the rates that apply to capital gains.

3.2 Identification and Estimation Strategy

Our empirical evaluation measures the responsiveness of various income sources to changes in tax rates. The specification applied to the ExecuComp data takes the form:

$$\ln(income_{it}) = \kappa_i + \beta \ln(1-\tau_{it}) + \gamma \cdot d_i \cdot \ln(1-\tau_{corp,t}) + X_{it}\,\Gamma + \varepsilon_{it}$$

where
- $\ln(income_{it})$ = Earned income (salary and bonus, LTIP, exercised options) before deductions
  = Total compensation (earned income + other income + restricted stock grants + Black-Scholes value of stock options)
- κ_i = Fixed effect
- $(1-\tau_{it})$ = After-tax share
- $d_i \cdot \ln(1-\tau_{corp,t})$ = "million-dollar rule" dummy interacted with log of after-corporate-tax share
- X_{it} = Market value of Firm, earnings-assets ratio, year (time trend)
- ε_{it} = $(\upsilon_i + \eta_{it})$ which includes an individual (executive) fixed effect and a random component

We estimate a similar model using the SOI for different (logged) measures of income including earned income, full taxable income (after deductions), and gross income as dependent variables.

The SOI does not include firm-specific information, so we use the market price-to-earnings ratio for the S&P 500, as well as the log of the S&P 500 index (expressed in constant dollars).

The SOI regressions are weighted to adjust for the SOI's non-random sampling properties. Selection into the SOI is conditional on several factors (including income) and sampling probabilities reach 100 percent for very high-income filers. The data are constructed such that a filer once sampled continues to be in the sample in all subsequent years, so long as her income increases (and her other characteristics, such as filing status, are unchanged). We weight each observation by the inverse of its sampling probability. The weighting adjusts for spurious correlation between changes in income (our dependent variable) and explanatory variables.[22] Without weighting, estimated tax responses to tax reductions will be biased upward, and for tax increases, downward.

We estimate the responses of both earned income (before deductions) and broader compensation measures (total compensation for the ExecuComp and gross income for the SOI). Prior analysis suggests that broader income measures are less responsive to tax changes than is taxable income (Gruber and Saez 2002 and Giertz 2005, 2006). Shifting between different forms of compensation intratemporally may explain the lower overall elasticity. Of course, shifting income to sources outside the measured base could result in a large elasticity.

An important feature of the behavioral response of high-income taxpayers is the ability to shift income intertemporally in anticipation of a tax change. To account for reactions to anticipated tax changes, we extend the basic specification to:

$$\ln(income_{it}) = \kappa_i + \delta \ln(1-\tau_{it+1}) + \beta \ln(1-\tau_{it}) + \gamma \cdot d_i \cdot \ln(1-\tau_{corp,t}) + X_{it}\Gamma + \varepsilon_{it}$$

where δ represents the response to anticipated tax changes. The estimated coefficient on the prospective net-of-tax rate (or after-tax share) measures the response of current income to an anticipated tax change. If anticipated effects are in fact important, then expected future tax cuts (hikes) should reduce (increase) current income, so that $\delta<0$. As a result, the net (longer-term) response of income ($\beta+\delta$) may be smaller in magnitude than the short-run response.

[22] That strategy is discussed and employed by Auten and Carroll (1999) as well as by Giertz (2006).

The other key explanatory variable is the after-tax share, calculated as one minus the sum of the federal, FICA, and state income tax rates. Economic theory suggests that current tax cuts (hikes) would increase (reduce) current income, so that $\beta>0$. Before further discussing our identification strategy, let us elaborate on the different sources of (identifying) variation in tax rates. All individuals face the same federal income tax *schedule* at any point in time. For taxable income with the SOI, marginal and average tax *rates* vary depending on filing (i.e., family) status, the number of exemptions (family size) and deductions, and unearned (interest, dividends, capital gains) and earned income (wages and hours worked). For earned income, however, tax rates do not vary based on family characteristics (but, do vary by state of residence) because those characteristics are not observed in the ExecuComp and, for the purpose of consistency in this analysis, the analogous tax rates for SOI earned income are assumed not to vary by family characteristics. The primary source of variation in tax rates occurs over time, as tax schedules and therefore tax rates change.

In much of the literature, marginal tax rates are imputed using a sophisticated tax calculator (such as the National Bureau of Economic Research's TAXSIM or the Congressional Budget Office's tax model). Two features of the ExecuComp data led us to a different approach. First, executives in our sample earn an average $1.9 million (2004$) in total compensation (including stock grants, options granted, and other income), with half earning more than about $790,000. Second, the data include limited demographic characteristics and no outside (of the firm) income information. As a result, we assign all executives in our sample the highest federal (and state) marginal income tax rates for each year that they are observed.

As alluded to earlier, identification is based primarily on time-series variation in federal, FICA, and top state income tax rates, as well as cross-sectional (i.e., locational) variation in state tax rates.[23] The drawback is that variation in federal marginal tax rates (across tax brackets) is not used to identify behavioral responses. Such variation, however, would likely have been noise, because most executives in our sample, if not in the top tax bracket based on earned income from the firm,

[23] State tax rates do vary across individuals, but that variation is likely correlated with unobserved non-tax factors and state fixed effects effectively remove some of that variation.

would be in the top bracket when other unobserved income sources are taken into account.[24] That strategy may be legitimately questioned for the SOI data, but our sample restriction (based on income) ensures that almost all observations are in the top bracket.

The regressions also include a separate tax variable to account for the $1-million limit on the deductibility (against corporate profits) of non-performance-related compensation (the "million-dollar rule"). This variable is set to zero for executives whose salaries did not hit the cap prior to 1994, and at the net-of-corporate tax rate for executives whose salaries exceeded the cap.

Estimating the behavioral response to taxes (especially over an extended period) poses several difficulties. At the most general level, it is difficult to distinguish behavioral responses from changes due to contemporaneous factors that are correlated with changes in reported income. That includes general economic conditions that affect firm performance and underlying trends that show a skewing of the income distribution toward the top, see PS (2003) and section 3. That income trend poses problems for estimates based on differencing strategies that use an unaffected group to help identify the underlying (non-tax-related) income trend for another group. The direction of any resulting bias is not always obvious, and can vary depending on the direction of the tax change. Between 1992 and 2004, taxes were increased and subsequently reduced, yet the underlying trend in the income distribution was largely unchanged. In addition, the economy was in the midst of the longest post-war boom in United States history (during most of which the federal income tax schedule remained unchanged). In our analysis, we present results for the entire period as well as for the OBRA 93 and EGTRRA tax changes separately. To control for longer-term trends in income, the regressions include a time trend.

Another concern when estimating behavioral responses of executives is the role of a firm's financial performance in determining executive pay. ExecuComp data provide specific information that we use to control for the firm's financial performance. Thus, the regressions include the market value and earnings-to-asset ratio of the firm, and purge non-tax factors from the estimated response.

[24] For example, Berkshire-Hathaway CEO Warren Buffett, widely regarded as one of the world's wealthiest individuals, had earned income of between $100,000 and $135,000 (2004$) based on our calculations from ExecuComp data. That alone would not put him in the top tax bracket, although he almost surely has other income that puts him in the top bracket.

4. Empirical Results: ExecuComp and SOI

This section presents regression results, using ExecuComp and SOI data, for different measures of income and for various samples and specifications. Note that we refer to our core estimates from the ExecuComp as "earned income" elasticities. Some other papers (Goolsbee, 2000, and HL, 2000) have referred to estimates for essentially the same income definition as "taxable income" elasticities. By labeling their income measure "taxable income," they assume that an array of factors such as marital status, spousal income, and deductions and exemptions do not vary across time or across individuals – other than what is captured by fixed effects and time-trends. Because it is likely that those variables do vary greatly across individuals and across time, we label the same measure "earned income before deductions." That approach recognizes that executive income from the firm is just one of the margins at which executives (and their families) can respond to changes in tax rates. We do refer to some of our estimates from the SOI as "taxable income" elasticities because the income measure for those regressions includes both spousal income and income from sources outside the executive's firm as well as deductions and exemptions.

4.1 Basic Results

We first present estimated earned income elasticities for executives in the ExecuComp, and then comparable results for all high-income taxpayers using SOI data, see Table 4.1, Table 4.2, and Table 4.4 to Table 4.7. The variables of interest are specified in logs, so that the coefficients on the tax variables represent elasticities. Key results from the various tables are summarized in Table 4.10.

Our basic specification, which includes only the current after-tax share, a time trend, and individual fixed effects, suggests a modest elasticity of earned income with respect to the after-tax share for the full 1992 to 2004 period, equal to 0.34 (with a standard error of 0.07). More sophisticated specifications, controlling for other factors, including future tax rates, firm-specific characteristics (e.g., the firm's market value and earnings to assets ratio) and the million-dollar rule, generate different results, however. The contemporaneous tax effect is substantially higher (1.09), but the future tax (or anticipatory) effect is negative and even larger, see column 4 of Table

4.1.[25] On net, the implied earned income elasticity is negative (-0.37). Other control variables are of the expected sign.

Sensitivity over Time and for Different Specifications

Estimated elasticities are quite sensitive to both the time-period and the econometric specification. In the basic specification, the earned-income elasticity (0.48) for the tax provisions of OBRA 93 is quite different from that for EGTRRA (1.09). That sensitivity is still present when controlling for other factors, though the pattern is reversed, with the estimated elasticity now larger for the early 1990s than for the early 2000s. Controlling for other factors yields much smaller estimated (net) earned-income elasticities,[26] ranging from -0.70 to 0.19 when including all of the control variables versus a range from 0.34 to 1.09 with the basic specification.[27]

Estimated responses to the increase in the top tax rate, enacted as part of OBRA 93, imply an elasticity of 0.82 that is offset by an anticipatory effect of -0.63, see Table 4.1, column 5. The net earned income elasticity of 0.19 is somewhat smaller than that estimated by Goolsbee (2000) for the same period. (Goolsbee's results suggest a 1.16 contemporaneous and a 0.4 net elasticity.)[28] It is worth noting that the shifting of income due to anticipated tax changes is similar in our estimates for both of the sub-periods (1992 to 1995 and 2000 to 2004). Both our results and Goolsbee's are in sharp contrast to HL (2000), who estimate a negative net earned income elasticity (-0.59) using data on CEOs. Using Goolsbee's specification, they find that income shifting dominates the current tax effect.[29]

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[25] Those results, based on long-term executives (i.e., executives appearing multiples years), are compared to estimates for all executives and discussed when we address the possible influence of attrition on our estimates.

[26] Note, the net elasticity is the sum of the estimated coefficients on the current after-tax share and the future after-tax share, see Table 4.1.

[27] Estimates are also generated for the ExecuComp using a method based on that employed by Gruber and Saez (2002). Observations are compared (i.e., differenced) across two years, one in a year prior to a tax change and one in a year after a tax change. For both OBRA 93 and EGTRRA, estimates were extremely sensitive to the choice of the beginning and end years. Additionally, standard errors are generally very large.

[28] Note that we do not have ExecuComp data for 1991. Apparently that year was included in the sample at one time, but is no longer present.

[29] However, when they include the current value of (unexercised) options held by the CEO as well as the current and future value of the firm's stock market returns, they find that, for OBRA 93, both the current tax response and the anticipatory (income-shifting) responses are small, resulting in a net elasticity that is close to zero. Even with those additional variables, HL's results are sensitive across time-periods and the estimated tax coefficients often do not carry the predicted sign.

HL's results are consistent with ours in terms of their sensitivity over time. In fact, when employing Goolsbee's specification, HL find inconsistent results in all regressions over the period 1980 to 1994 (broken down for periods 1980 to 1983, 1985 to 1989, and 1990 to 1994), with the wrong sign on at least one of the key coefficients or the wrong sign for the net elasticity.

The negative net earned income elasticities estimated using the 1992 to 2004 and 2000 to 2004 ExecuComp data (see columns 4 and 6 of Table 4.1) are inconsistent with standard economic theory, and would suggest our empirical model is poorly identified. It is possible that identification is compromised by non-tax-related changes in income (e.g., business-cycle effects) that are not fully accounted for by firm-specific information (such as firm market value). The extreme volatility of executive income makes isolating a tax response especially difficult.

Several factors may explain why the results for OBRA 93 are different. The first factor is the change in the top federal marginal rate, which occurred in each year from 1992 to 1995. Thus, at least one of the two key independent variables (the current and future after-tax shares) is changing each year from 1992 to 1994. Between 1994 and 1995, however, tax rates are constant and allow for the identification of the counterfactual income trend. It is possible that the unexplained portion of the large increase in income from 1994 to 1995 leads to the resulting positive net elasticity estimate, since that implies that income growth from 1992 to 1994 would have been similar, or at least quite large, had the tax increase not been enacted. Whether the 1992 to 1995 regression is well-identified depends, to a large degree, on whether, after controlling for the other covariates, income growth between 1994 and 1995 is indicative of what would have occurred from 1992 to 1994 absent the tax increase or whether the growth from 1994 and 1995 was an aberration.

The 2000 to 2004 period includes a recession, which coincided with extreme volatility in the stock market and in the incomes of executives. As shown in Figure 2.4, earned income at the 95th percentile falls at a much faster rate than the S&P 500. That decline occurs as tax rates decline. In 2004, when tax rates were unchanged, income rose rapidly, and at a much faster rate than the S&P 500. It is possible that the inclusion of firm-specific information and individual fixed effects still imperfectly controls for income volatility, leaving a spurious correlation between the rising after-tax share and the sharp drop in income.

Attrition and Sample Selection

An additional consideration with the ExecuComp data is attrition. Nearly half of executives sampled appear in four or fewer years (from 1992 to 2004), suggesting that attrition is potentially important, see Table 4.2. We minimize the potential bias from nonrandom attrition by estimating fixed-effect regressions. While the lack of observable characteristics in the ExecuComp prevents us from gauging the impact of attrition across demographic factors, there appears to be little difference in estimates when restricting the sample to those appearing in multiple years, as compared to estimates without any restrictions on the number of times that an executive appears in the sample.

To better gauge the impact of attrition in the ExecuComp data, we estimate earned-income elasticities separately both for long-term executives (defined as appearing in the sample every year or at least 5 years, depending on the time-period) and for all executives (with no floor on the number of times an executive is sampled), see Table 4.3 and compare to Table 4.2. Overall, we observe slightly smaller net earned income elasticities for long-term executives (between 0.19 and -0.70) than for all executives (0.58 and -0.51), though results are similar for the groups in the full period.[30] The largest difference is observed over the 1992 to 1995 period, in which the elasticity of all executives (0.58) is three times that of long-term executives (0.19), due exclusively to an increase in the estimated current elasticity, see column 5 of Table 4.1 and Table 4.2. The differences in estimated elasticities across the two samples are not as large as the differences observed over time.

Non-random attrition, however, remains a potential source for bias, to varying degrees, in both sets of estimates. For example, executives experiencing drops in income may be more likely to fall from the sample, while those with increasing income may be more likely to remain in the sample. To the extent that attrition is important, and follows the pattern just discussed, then a declining after-tax share (early 1990s) is likely to lead to a downward bias in the estimated elasticity, whereas an increasing after-tax share (early 2000s) is likely to have the opposite effect. While the response of long-term executives is less likely to be affected by such attrition, their responsiveness may be very different from that of all executives. Depending on the question, the most relevant earned income elasticity could be that estimated for the entire sample, including all entry into and exit

[30] Goolsbee (2000) focuses primarily on those appearing in at least four years, but notes that his results are not sensitive to that decision.

from the sample. Also, note that incomes may fall for reasons that are unrelated to taxes and that the model's controls do not adequately take into account – for example, mean reversion or retirement. In such cases, attrition could actually improve estimates by fortuitously removing anomalous observations from the sample.

Comparison to Statistics of Income Earned Income

The basic results from the SOI sample suggest that earned income for high-income taxpayers is far more responsive to tax rate changes than it is for other executives, see columns 1 to 3 of Table 4.4. The degree to which the elasticities are different is striking: the SOI estimate of 3.22 is about 10 times that of the ExecuComp. Although the two estimates are based on somewhat different measures of income (SOI income includes income earned outside the firm as well as spousal income), it is unlikely those other sources of income alone account for nearly an order of magnitude difference in the elasticity. The basic specification also yields earned income elasticities that are stable over time, in the range of 3.2 to 3.3.

With additional controls, however, both the level and the stability change. Controlling for anticipation effects and market characteristics lowers the SOI estimated elasticity by about 37 percent, to a net 2.0 for 1992 to 2003, and 0.4 for 2000 to 2003. A concern with those estimates is that the current and future tax rates are of the wrong sign, suggesting that taxpayers shift income in such a way that raises their tax liability. That is, current income *falls* with an increase in the current after-tax share and *rises* with an increase in the future after-tax share. The SOI specifications may be under-identified because of the lack of firm-specific information in the SOI – information that would likely control for a portion of the income shifting that is not related to tax factors. Restricting the sample to 1992 to 1995 yields negative (though statistically insignificant) coefficients for both the current and future estimated coefficients.

The SOI-based estimates are quite different from Goolsbee's (0.40) and ours (0.19), suggesting that ExecuComp executives may not be representative of all high-income taxpayers. Supporting evidence for that difference is the much greater volatility of executive incomes, including the observation that executive incomes rose much more rapidly during the 1990s and declined more sharply after 2000 than did incomes for the highest-income taxpayers. Feenberg and Poterba (2000) have also noted that CEO compensation increased much more rapidly from 1990 to 1995 than did

AGI for the top half of the top one percent. Whether that volatility reflects differences in the behavioral response of executives to taxation or simply generates identification problems remains an open question.

Broader Measures of Income

Part of the response of taxpayers to tax rate changes is shifting income between taxable and non-taxable sources. Examining behavioral responses for a more comprehensive income measure can provide some indication of whether behavioral responses are the result of shifting among income sources (i.e., shifting income outside the taxable base or expanding the use of deductions in response to a tax increase) or whether they reflect changes in labor supply (broadly defined), in which case work effort, leisure, or other non-market activities are the margins on which people are more likely to respond. The fungibilty of executive compensation, recently documented in the popular press, is indicative of the potential for a wide array of taxpayer responses.

Because there are fewer margins by which to respond (and because the denominator is larger), the elasticity for broader measures of compensation is likely to be lower than for the narrower income measures used in the previous regressions. The broader measures of income examined here include total compensation, gross income, and full taxable income (less capital gains). Total compensation in the ExecuComp data is the sum of earned income, restricted stock grants, the Black-Scholes value of unexercised options granted, and other income. Gross income and full taxable income are calculated for the SOI, where gross income equals total income before exemptions and deductions (and less capital gains and Social Security benefits, which are not always observed), and taxable income equals gross income less exemptions and deductions.

The estimated elasticity of total compensation with respect to the after-tax share is -0.95 when including only a time-trend and individual fixed effects, and -2.02 with controls for the future after-tax share and firm-specific variables, see columns 1 and 4 in Table 4.5. The negative elasticities contradict standard theory and, as in the case of earned income, may result from the sharp growth and volatility of stock options. Of course, some of that response could reflect an increase in non-taxable or tax-deferred compensation. By the time individuals realize income, the higher tax rates may not be in effect. Also, recall that the regressions are identified using time (and, to a limited extent, state) variation in marginal tax rates. We impose restrictions on the

variation in compensation over time by including a linear time-trend. An alternative approach, including year dummies (instead of a time-trend), would impose stronger controls for non-tax related changes in stock options or total compensation. Year dummies, however, would eliminate the bulk of the variation in the marginal tax rates. Variation in state rates may help with identification, but those rates are tied exclusively to geographic location and much of their influence is absorbed by the fixed effects.

The SOI results for full taxable income (excluding capital gains) and gross income are similar to the corresponding earned income estimates and show almost no variation across time-periods, see Table 4.6 and Table 4.7. One difference of note is that the OBRA 93 estimated current and future elasticities, in the full specification, are of the correct sign, though not statistically different from zero in either case. That suggests that for that period, the tax response is moderate to small. More generally, broader income measures seem even less sensitive to tax rates. While that finding is consistent with other research, the inconsistent signs and the sensitivity of tax effects over time caution against reading too much into those results.

Decomposition of Behavioral Response, by Level and Type of Income

Recent work evaluating the behavioral responses to taxation emphasizes the role of institutional factors (Slemrod and Kopczuk 2002, Goolsbee 2000, Kopczuk 2005), arguing that the elasticity of taxable income is not a structural parameter, but rather a function of the tax system. Taxpayers are more responsive when opportunities to avoid taxes are more prevalent (or less costly). Features that influence responses to taxes include the availability of substitutable forms of compensation (such as the ability of firms to use non-taxable fringe benefits as opposed to taxable compensation) as well as the expected penalties for evasion. Higher-income executives may be more responsive to tax changes because they have greater opportunities for tax avoidance; however, their unobservable characteristics may differ from those of other executives, so we cannot conclude definitively that differences in estimates across income groups are due to institutional factors. The remainder of this section examines whether higher-income executives have higher elasticities.

We estimate elasticities (for executives) for different segments of the income distribution and for various components of income. We present results at different (permanent) income cutoffs and for salaries and long-term incentive plan (LTIP) payouts, see Table 4.8 and Table 4.9). The permanent

income cutoffs are set at $650,000 (columns 4 to 6) and $1 million (columns 7 to 9). In each case, the results are compared to the basic elasticities, see Table 4.1 and Table 4.2.

The results suggest that the higher the permanent income of executives, the larger the contemporaneous tax elasticity of earned income. For the full period, the estimated elasticity with respect to the current after-tax share rises from 1.09 among all executives to 1.35 for executives with more than $650,000 in permanent income, and 1.71 for those with at least one million dollars (all statistically significant). The results also show that shifting of income over time is stronger among the highest-earning executives: the coefficient on the future tax rate rises from -1.46 to -1.90 to -2.54, respectively. It is only for 1992 to 1995, however, that the contemporaneous response dominates the anticipatory response, yielding a positive estimate for the net elasticity.

If wages and salaries are not as easily shifted compared to other types of compensation (e.g., bonus income and stock options), then the elasticity for wages and salaries should be smaller than for all earned income. To test that hypothesis, we estimate separately the response of the wage and salary component of income (columns 4 to 6 of Table 4.8) and of LTIPs. One complication is that the median reported LTIP payout in the sample of executives is zero; in fact, only the top 10 percent of the sample ever reports any LTIP payouts. To estimate these regressions in logs requires that we add a constant (1) to the LTIP variable.

Our results show that wages and salaries are much less responsive to taxes than is earned income, see Table 4.9. The coefficient on the current after-tax share with respect to wages and salaries is 0.24 for long-term executives (0.35 for all executives), much lower than the earned income estimates of 1.10 (1.33 for all executives). The estimated anticipatory tax responses are also dramatically smaller on the salary margin than on the overall earned income margin. Those results suggest that salaries are not the main avenue through which executives respond to tax changes and that earned income responses are largely driven by income sources other than wages and salaries.

One margin for the non-wage and salary response is long-term incentive payouts (LTIPs). LTIPs show some responsiveness to changes in tax rates, see Table 4.9, columns 7 to 9. The short-run (or transitory) elasticity seems to be well identified only in shorter time periods around tax changes.

One explanation for that is that the low rate of reported LTIPs makes it difficult to identify any response in the full 1992 to 2004 period. We therefore focus on the OBRA 93 and EGTRRA; estimates for both of those periods show theoretically consistent results and support the hypothesis that behavioral responses are larger for non-wage and salary sources of earned income.

Summary of Elasticity Estimates

We summarize the myriad of tax elasticity estimates from our richest specification in Table 4.10, which presents estimated coefficients for both the contemporaneous and future after-tax share, as well as the number of observations and executives or tax units. We present results along four dimensions: data source (columns 1 and 2), time period (columns 3 to 5), level of income (columns 6 and 7), and type of income (columns 8 to 10). The first finding is that the source of data itself contributes to the uncertainty in measuring behavioral responses at the top of the income distribution. The elasticity seems to be both larger and more concentrated on the future tax rate for all high-income taxpayers than for executives. That finding could be interpreted as evidence that high-income taxpayers are a heterogeneous group and differ in their behavioral response. Other potential explanations include differences in the construction of the two datasets, including the fact that the observed margins (income sources) for responding are different. The second finding is that the earned income elasticity is sensitive to the time and therefore the tax changes examined. The contemporaneous tax effect is large in response to OBRA 93 (0. 82) but effectively zero for EGTRRA (-0.01). Finally, the elasticities of total compensation and of wage and salary income are smaller than for earned income, suggesting that much of the response represents shifting between sources of income. Section 5 presents a more comprehensive analysis of shifting. First, we discuss why executives may be different from all high-income taxpayers.

Other Explanations: Why Executives Might be Different

We have shown not only that tax responses appear much larger for all high-income taxpayers than for the subset of top executives, but also that the non-tax related growth in executive pay has followed a different path from that followed by top income earners more generally. The elasticity estimates are notably consistent with the empirical tax literature that finds large (or larger) elasticities for very high-income individuals, but small permanent elasticities for executives (see Goolsbee, and HL). We now discuss why executives may respond differently to tax changes than other tax filers with similar incomes.

First, executives likely have greater ability to shift income, both inter- and intratemporally between sources than do other high-income taxpayers. That is consistent with Goolsbee's (2000) finding that "as much as 20 percent" of the total drop in wages and salaries among the top 1 million taxpayers after OBRA 1993 may have been due to individuals in the ExecuComp.

Second, executives have an unusual relationship with their employer, the shareholder. In principle, executives are merely agents with a fiduciary responsibility to serve the interests of shareholders. However, some analysts allege that the relationship is often turned on its head. Because most shareholders are not privy to the day-to-day operations of the firm, corporate executives may, to a degree, work to serve their own interests at the expense of shareholders – in part by granting themselves (sometimes clandestinely) enormous compensation packages with lavish perks, some of which may insulate executives from tax changes. In addition, a growing and often clandestine source of executive compensation that may insulate executives from tax changes is the use of tax gross-ups.[31] According to the *Wall Street Journal*, "[A] number of companies are paying extra sums to cover executives' personal tax bills. Many companies are paying taxes due on core elements of executive pay, such as stock grants, signing bonuses and severance packages. Others are reimbursing taxes on corporate perquisites, which are treated as income by the Internal Revenue Service. They run the gamut from personal travel aboard corporate jets to country-club memberships and shopping excursions." That suggests that, at least on paper, many executives

[31] Maremont, Mark,"Latest Twist in Corporate Pay: Tax-Free Income for Executives," *Wall Street Journal*, December 22, 2005, A1.

may not bear the burden (or reap the benefits) of changing tax rates – and thus would not be expected to respond in any way to changes in tax rates.[32]

Third, tournament theory, first articulated by Lazear and Rosen (1981) and often applied to executive compensation, posits that lucrative compensation packages received by executives do little to motivate the executives, but do motivate lower-level employees that aspire to one-day become executives.[33] Consider the analogy of a professional golf tournament where prize money – the winner can sometimes receive upwards of $1 million – serves to motivate not just the winner, but all of the other participants vying for the title. Paradoxically, while tournament theory predicts small behavioral responses for executives, it does not imply that overall behavioral responses are small – just that those responses are made by other employees in the corporation. Another characteristic of a tournament-based pay structure is that participants are rewarded based on relative performance as opposed to absolute performance.[34] That is a desirable pay structure for some activities, where absolute performance is difficult to measure. The golfer, like the executive, is measured against the performance of his peers: What would be a mediocre golf score in good weather conditions may be a winning score in rainy or windy conditions. Likewise, for the corporation, performance considered mediocre during a strong economy may represent a phenomenal achievement during a weak one.[35]

Finally, while earned income (before deductions) appears less responsive to changes in tax rates for executives than for other very high income taxpayers, it does not necessarily follow that executives are also less responsive when measured by full taxable income. It may be that incomes for executives are very responsive to tax changes, but that the margins by which executives respond

[32] Of course, while some executives may appear to be shielded from tax changes, they may in fact bear some burden. For example, tax changes may affect changes in salaries for executives, despite tax gross-ups, and other forms of compensation may respond to changing rates. Some allege that tax gross-ups are simply a way for corporations to clandestinely increase executive salaries. In fact, the SEC generally does not require corporations to report tax gross-ups (under pre-2007 SEC rules). While competition should minimize the ability of executives to pursue avenues that do not best serve their shareholders, the recent rapid rise of executive compensation, along with outright fraud on the part of some firms, has done little to assuage critics.

[33] Empirical findings by Eriksson (1999) for executives in Denmark are generally consistent with tournament theory.

[34] This applies to longer-term behavioral responses and does not apply to the intertemporal shifting of income or to shifting between different sources of income that face different tax treatment.

[35] While tournament theory seems to fit the market for corporate executives more closely than most markets, it may well be prevalent in other areas. In fact, in any occupation where promotion is accompanied by an increase in salary, tournament theory may play a role.

are not reported in the executive compensation data, where, for example, income from outside the firm, spousal income, and deductions and exemptions are not reported. Our earned income measure from the tax data is designed to closely approximate the income measure constructed from the ExecuComp, but the two measures are not identical. While the SOI earned income measure does not include deductions and exemptions, it does include earned income from all sources – for executives that means not just income from the firm, and for married filers it includes the spouses earned income (if any).

5. Income Shifting in the ExecuComp Data

In this section, we discuss the tax treatment of the major forms of executive compensation and evaluate more directly the impact various taxes may have on the composition of executive compensation. We follow HL's (2000) approach, and first describe the intuition behind the predicted tax effects. We then present regression results for the share of executive compensation paid in stock options rather than cash.

Hall and Liebman (1998 and 2000) apply agency theory to explain stock-based compensation in executive pay and show how the tax treatment of various sources of income can alter the desired compensation packages that firms pay their executives. To evaluate the tax advantage of options relative to cash, they compare a pretax cash payment of $1 with an option payment with an equivalent post-tax net-present-value (NPV) to the company. They show that the tax advantage of options declines with the corporate tax rate and increases with the personal and capital gains tax rates. Additionally, because of the so-called "million-dollar rule," performance-based pay (i.e. options) is tax-preferred for executives with more than $1 million in annual compensation. That is because "non-performance-based" pay (i.e., salary) in excess of $1 million is not deductible from the firm's revenues.

The most direct advantage to executives of incentive-based pay generally arises from the deferral of tax liabilities. The benefit to the executive of deferral is offset, however, by the deferral of tax deductibility for the corporation. As such, the tax advantages of nonqualified options from a combined (executive and corporate) perspective are not straightforward, and change as personal,

capital gains, and corporate tax rates change.[36] It is therefore useful to examine the marginal impact of each tax separately.

Corporate Tax Rate. The lower the corporate tax rate, all else equal, the more favored are options relative to cash, because the deduction against corporate revenues is deferred with options, whereas it is immediate with cash compensation. Thus, low corporate tax rates lower the cost of deferral to the firm and favor options.

Personal Tax Rate. A lower personal income tax rate tends to favor options relative to cash, all else equal. Personal tax rates affect the value of options because returns to nonqualified options are taxed (when realized) at the personal tax rate as opposed to the capital gains rate. Thus, the lower the personal income tax rate, the greater the advantage from avoiding the capital gains tax and using options.

Capital Gains Tax Rate. The lower the capital gains tax rate, all else equal, the less tax favored are options relative to cash. NQSOs are taxed at the individual income tax rate, and avoid the capital gains tax. Therefore, a lower capital gains rate reduces the tax savings associated with options.

HL (2000) show that through 1986, options were at a tax disadvantage relative to cash. The Tax Reform Act of 1986, by substantially lowering individual tax rates and raising capital gains rates, shifted the balance to favor options. The 1990s tax acts reduced the tax advantage of options by raising individual income tax rates (OBRA 90 and OBRA 93) and lowering capital gains tax rates (TRA 97). The net effect of those tax changes left options at a slight tax advantage of $4 per $100 in pre-tax compensation (HL, 2000). Figure 3.1 depicts top federal marginal tax rates on earned income, capital gains, dividends, and corporate income since the late 1980s.

It is the variation in rates on the various sources of income that provide the impetus for the empirical strategy we use to measure income shifting across tax bases. Note that the previous discussion does not address the cross-sectional variation in federal personal, capital gains, and corporate tax rates. Very few executives in the ExecuComp database would qualify for the lower

[36] See discussion of tax treatment of non-qualified options in section 2.

capital gains tax rates or a personal income tax rate below 33 percent, thus cross-sectional variation in the tax schedules is likely not relevant here.

As with the earlier empirical analysis, we rely almost exclusively on variation in the different tax rates over time. The top marginal state tax rate does introduce some cross-sectional variation, based on the executive's location. Our measure of the corporate tax rate − the maximum statutory rate − is one where we arguably could introduce cross-sectional variation. Corporate marginal tax rates can vary for many reasons, including tax-loss carry-backs and carry-forwards, investment tax credits, and the corporate alternative minimum tax, adding potentially identifying variation. There are at least two problems with simulating a firm's corporate tax rate. First, the data needed to estimate the rate are difficult to access. Second, it is not clear that cross-sectional variation in the corporate tax rate provides identifying variation. Firms are subject to different tax rates for reasons that are independent of compensation decisions. Nonetheless, that issue could be addressed more formally in future work.

One advantage of the time period we examine is that the rising and then declining use of stock options may enhance our ability to identify non-tax factors. The proportion of executives reporting any stock option grants in the ExecuComp data increased from 65 percent in 1992 to 80 percent in 2001, but decreased to 73 percent by 2004. HL (2000) argue that the primary factors explaining the growth of options are related to corporate governance and the rise in the power of shareholders. HL control for the share of company stock owned by institutional investors, the size of the board, and the fraction of the firm's board members who are inside directors (i.e., those having substantial ownership in the corporation). We use variables included in the ExecuComp data, such as whether the firm has an annual director retainer, a director meeting fee, and the number of board meetings. Our regressions also control for the firm's financial situation (market value, earnings-asset ratio, and implied volatility of company stock), and for individual fixed effects, as well as a time trend.

Table 5.1 presents regression results. The dependent variable is the fraction of total compensation that is in the form of either stock-option grants (columns 1 to 4) or restricted stock (columns 5 to 8). We define total compensation to include the Black-Scholes value of stock-option grants plus salary and bonus, LTIP payouts, and any other income. The share is regressed on the log of the after-tax share for the statutory personal, capital gains, and corporate tax rates.

The predicted coefficients for the after-tax shares are positive for the personal and corporate tax rates, and negative for the capital gains rate. Similar to HL, we find the wrong sign on the personal and the capital gains rate. The only tax variable of the correct sign in HL's analysis is not identified in our model (estimated with standard errors near 1) and is of the wrong sign. Are results are not sensitive to the set of control variables. Thus, time variation in the relevant tax rates, resulting largely from four discrete points (1993, 1994, 1997, and 2002), does not seem sufficient to identify behavioral responses in this case.

Table 5.1 also presents results for restricted stock, which typically is not considered performance-based. Restricted stock vests over time, and may be taxed at the personal rate (on the value of the restricted stock) as it vests, or at the grant date (in which case appreciation would be subject to the capital gains rate). The story here is similar to that for options, with the additional complication that tax effects seem more sensitive to specification and sample choice.

6. Conclusions

This paper examines recent income trends and behavioral responses to tax changes for some of the very highest income U.S. taxpayers. Special attention is paid to the top ten and top one percent of all U.S. taxpayers and to a sample of corporate executives, most of whom fall into the top one percent of the income distribution.

We document the growth in upper incomes from 1992 to 2003 for high-income taxpayers and from 1992 to 2004 for executives. We find that (consistent with PS 2003) most of the growth and volatility in incomes has been concentrated within the top one percent of taxpayers. Income for the very top of the distribution grew sharply through 2000, and then declined sharply from 2000 to 2002. Outside the top centile, income patterns are much more stable. Focusing on executives, we find income patterns that are similar to, but more volatile than, those for the very highest income taxpayers. We also document how the composition of executive compensation has changed. We find that salary income has been relatively stable, while the value of stock options, stock grants, and bonuses has grown tremendously; for CEOs, HL (2000) document such growth back to at least the early 1980s. We show that the trend is similar for executives more generally and the rapid growth in those forms of compensation during the 1980s continued through the 1990s, before

dropping sharply in 2000. By 2003, executive compensation had begun to recover. Since 1993 (and at least through 2004), the value of stock options has been the largest source of executive compensation, growing by 145 percent since 1992, despite a drop of roughly 50 percent since 2000.

To measure transitory and permanent (or long-term) behavioral responses to the tax changes of the 1990s and 2000s, we employ Goolsbee's techniques both for executives and for high-income taxpayers. For executives, we find a permanent earned income elasticity for the early 1990s of 0.8 (with no anticipation effect), which is substantially higher than Goolsbee's estimate. For 2000 to 2004, the estimate is much larger, but the results are suspect because the coefficient for the anticipated effect has the wrong sign. Limiting the analysis to only taxpayers with the highest incomes yields estimated coefficients that carry the correct sign. The estimated short-term responses are larger for the higher-income groups, although not necessarily the permanent responses.

Finally, we follow HL (2000) in examining how the composition of executive compensation responds to changes in relative (corporate, personal, and capital gains) tax rates. But while estimates differ substantially from those of HL, who focus on CEOs and examine an earlier period, it is noteworthy that both sets of estimates often yield estimated coefficients with signs that contradict theory. That and the fact that our core elasticity estimates differ greatly across time-periods and across our two datasets suggest that non-tax factors both are extremely important and make identification difficult. That observation is consistent with several other papers (Slemrod 1996, Saez 2004, Kopczuk 2005, Giertz 2006) that all show a great deal of sensitivity surrounding taxable income elasticity estimates.

While the elasticity of taxable income is a very important parameter, it has been difficult to pin down. That suggests three directions for future research. One direction would continue to improve estimation techniques and develop more sophisticated instrumenting strategies to control for non-tax related trends in income. Along those lines, Kopczuk (2005) treats mean reversion and secular trends in income with separate variables, arguing that trying to control for those two separate effects with a single variable will likely be insufficient. A second and related approach would focus on the underlying income trends in order to get a better idea of what non-tax factors may be driving them. A third would focus on individual sources of income. Studying individual

sources (or components) of taxable income can be misleading if results are used to imply an overall elasticity, but a narrower focus may make identification less difficult and may give an indication of the key components driving the overall response.

Appendix. Top Income Shares: Extending Piketty and Saez (2003)

An examination of upper-income shares suggests that the rapid growth in executive compensation is not exclusive to executives, but is reflective of the overall pattern of income growth at the very top of the income distribution. We build on Piketty and Saez (2003) by calculating the share of income received by different fractiles within the top decile of tax filers for years 1992 to 2003. They use primarily SOI data based on actual tax returns to provide a detailed analysis of top U.S. income shares from 1913 to 1998.[37] PS report that from 1921 until the U.S. entered World War II, the share of gross income accruing to the top decile is always greater than 40 percent and on a couple of occasions exceeds 46 percent. But, during WWII, the top decile experienced a sharp drop in its share of gross income, falling below 32 percent for 1944. Furthermore, before WWII, sharp drops in the share of income accruing to the top decile were quickly recouped, often within a year or two, whereas the pattern post-WWII was very different. The top decile's share of income remained flat until the early 1980s, when it steadily grew from less than 33 percent of total income in 1981 to over 41 percent in 1997 and 1998. In fact, by the middle of the 1990s, the top decile had recouped much of what it had lost during WWII.

While there is no indubitable explanation for the sharp decline of the top decile during WWII and then for its subsequent rise beginning in the early 1980s, PS (2003) and Saez and Veall (2005) put forth a hypothesis. PS suggest that the shift toward a steeply progressive income tax schedule, plus wage controls during WWII, especially hurt the top decile.[38] The steeper tax rates on income coupled with high top rates for the estate tax may have prevented the top decile from quickly recouping what it had lost during WWII. PS also emphasize the shift in social norms, which may have manifested itself in the increasing role of unions and the adoption of transfer programs such

[37] Their data on the top centile begins in 1913, while that for the top decile begins in 1917.
[38] Piketty and Saez note that the top marginal rate on income rose from 20 percent in the early 1930s to 91 percent in 1944. While those top rates did not directly impact most taxpayers, they did affect those at the very top of the income distribution.

as Social Security and Aid to Families with Dependent Children, which in turn may have restrained income growth at the top of the distribtution. Because of the abruptness of the drop in the share of income at the very top, PS downplay the role of both technological change and of changing education levels.

With respect to the increase in top income shares in recent decades, PS continue to downplay the role of technological change, while Saez and Veall are agnostic with respect to the role of less progressive taxation at the very top of the distribution. On one hand, the concentration of U.S. incomes at the very top of the income distribution has greatly increased in recent decades, as top tax rates have dropped substantially. On the other hand, they note that the trend in the share of income at the top of the Canadian income distribution closely parallels that of the U.S., despite a much smaller decline in Canadian tax rates. Saez and Veall then put forth a "brain drain" hypothesis that could help explain the similar trends between the two countries. The hypothesis argues that the proximity, similarities in culture (including language), and relative ease of migration between Canada and the U.S. could have an equilibrating effect on top incomes between the two countries. It follows that the drop in top U.S. rates may have induced emigration from Canada, lessening high-income labor supply in Canada and thus pushing up incomes for that group. Saez and Veall note that the growth of top income shares in the United Kingdom and France is consistent with that hypothesis: Top income shares in the United Kingdom rose substantially, but by a smaller amount than in the U.S. or Canada, while top income shares in France remained stable. It is also possible that changes in top U.S. tax rates induced some emigration of high-income individuals from the U.K. to the U.S., where both countries share the same language, but relatively little emigration from France.

For 1992 to 1998, our estimated income shares for fractiles in the top decile mirror those presented by PS, and, for 1992 to 2003 the fractile analysis is consistent with the examination of upper-income percentiles discussed earlier. While we focus the fractile analysis on gross income (the measure most often used by PS), we also present fractiles based on taxable and earned income, see Table A.1. The shares are different for the different income measures, but the trends are the same.

Fractile income growth. The patterns for the top decile, the top 5 percent, and the top centile are all quite similar, with income rising sharply from 1994 to 2000 and falling sharply from 2000 to

2003. The average annual increase in the top decile between 1994 and 2000 was 4.3 percent, see Appendix Table A.1. From 2000 to 2003, gross income for that group fell by an annual average of 1.8 percent.[39]

For the full period, 1992 to 2003, income in the top decile grew by a total of 20.8 percent, compared to 14.1 percent for all tax filers. Within the top decile, however, that growth was heavily skewed toward those at the upper end: For those in the 90th to 95th percentiles income growth was 15.1 percent, just slightly higher than the overall average. For those in the 95th to 99th percentile that rate was 20.1 percent, or nearly one-third larger. And, for the top tenth of the top centile, total income growth was 32.6 percent, or well over twice the rate for the bottom half of the top decile.

Fractile income shares. The top decile did quite well from 1992 to 2003 when measured not only by overall income growth, but also by their share of total income (relative to all taxpayers). Not surprisingly, that performance is not reflected throughout the top decile, but once again is driven by the top centile, see Figure A.1 and Table A.2. The share of income received by the 90th to 95th percentiles increased by less than one percent from 1992 to 2003, while for the 95th to 99th percentiles it increased by a total of 4.7 percent. The share of income received by the top centile, as a whole, grew 10 percent, while the share for the top one-hundredth of the top centile grew 17.7 percent. In fact, of the total $1.2 trillion increase in gross income from 1992 to 2003, over 49 percent accrued to the top decile. Of the total increase in income within the top decile, 40 percent accrued to the top centile, and of the increase in income within the top centile, 78 percent accrued to the top half of the centile, see Table A.2, Panel 4.

However, income shares in the top centile are also the most volatile, see Figure A.2 and Table A.1. While those in the 90th to 99th percentile maintained a relatively stable share of income over the period, those in the top centile experienced big swings. From 1994 to 2000, during the bull market on Wall Street, the share of income accruing to the top centile grew at an average rate of 4.3 percent a year (or by a total of 29.8 percent). For the top one-hundredth of the top centile, that number was 10.5 percent (or by a total of 73.2 percent) – nearly two-and-a-half times as large. From 1998 to 2000, the growth at the top reported by PS continued at an annual rate of 3.5 percent for the top

[39] Income growth rates are calculated on a per capita basis to account for the growth in the number of tax returns over the years of our sample.

centile and 8.6 percent for the top one-hundredth of the top centile. That trend reversed itself after 2000. With the stock market's fall in 2000 and the subsequent recession in 2001, incomes for the top centile fell and stagnated. The share of gross income for the top half of the top centile fell by an annual average of 2.8 percent from 2000 to 2003 and by 5.2 percent for the top one-hundredth of the top centile.

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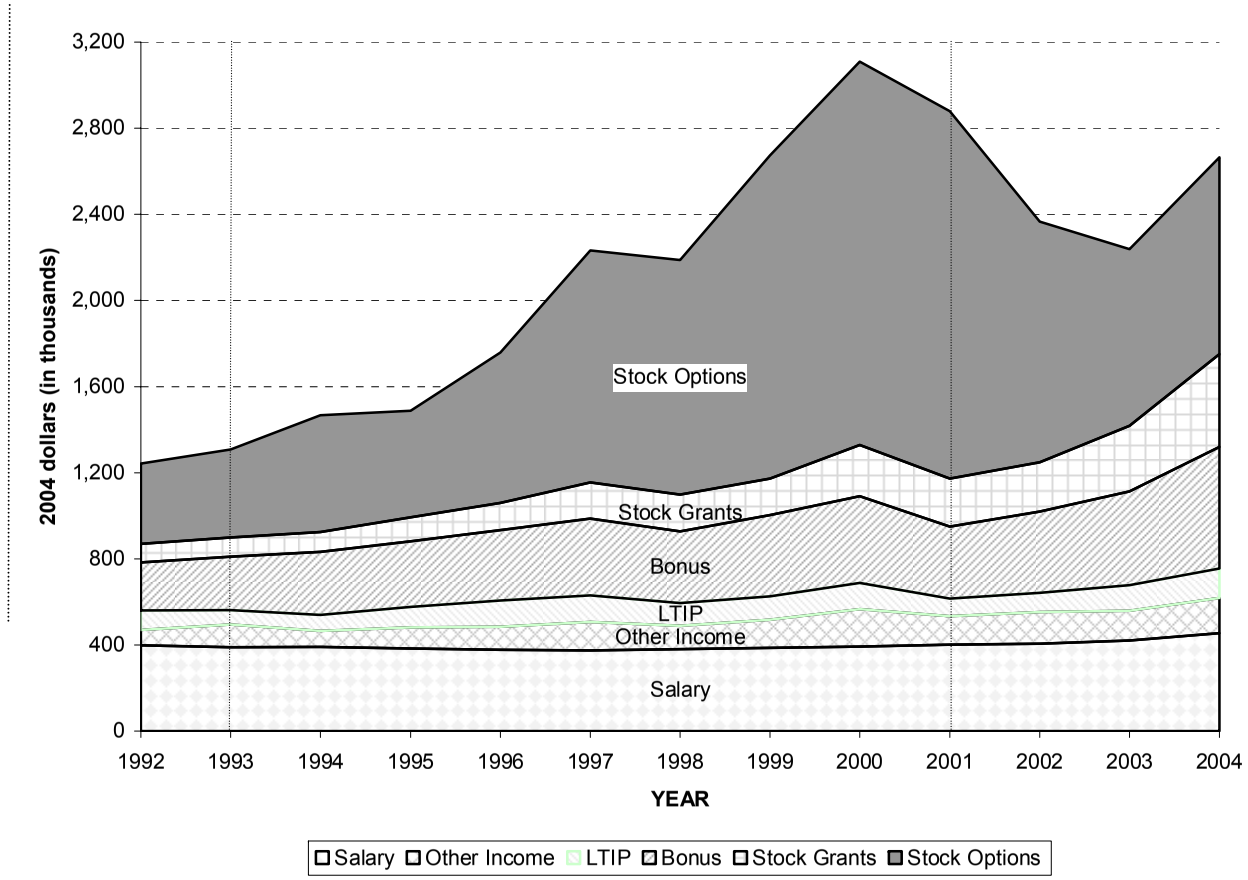
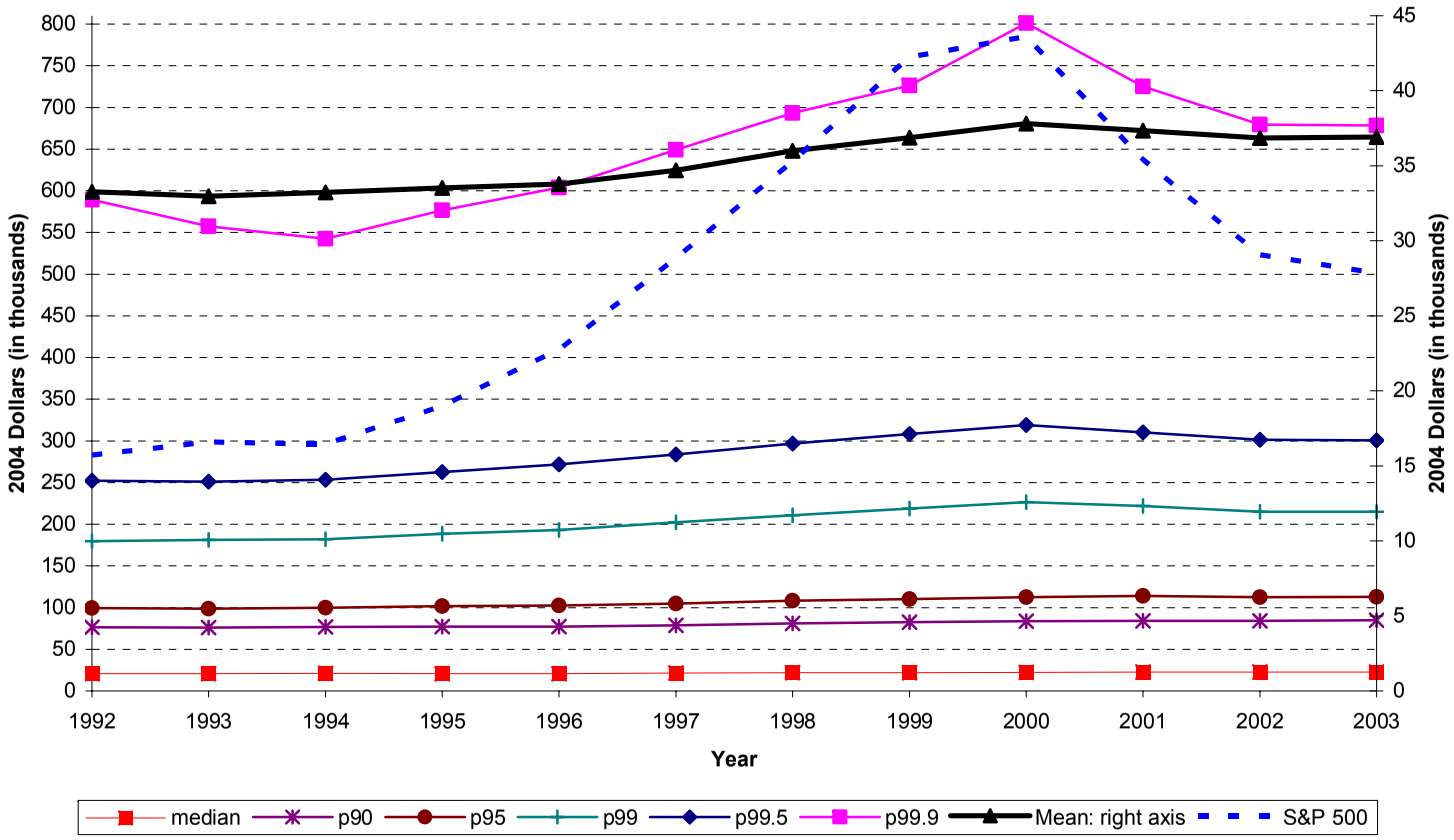
Figure 2.1. Composition of ExecuComp Compensation by Source: Mean Values for Those with Fiscal Years Ending in December



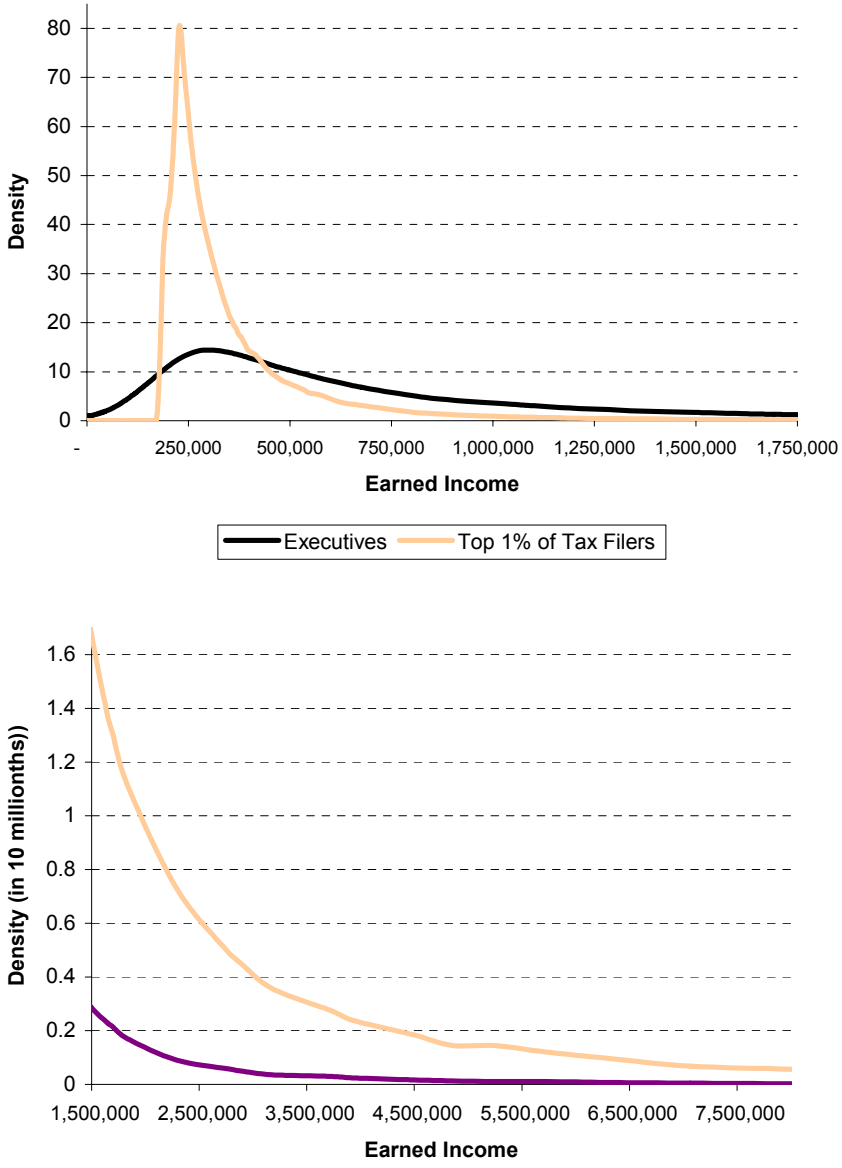
Source: Calculations are based on the Executive Compensation Database.

Figure 2.2. Upper Income Trends in Earned Income for Various Percentiles, 1992 to 2003



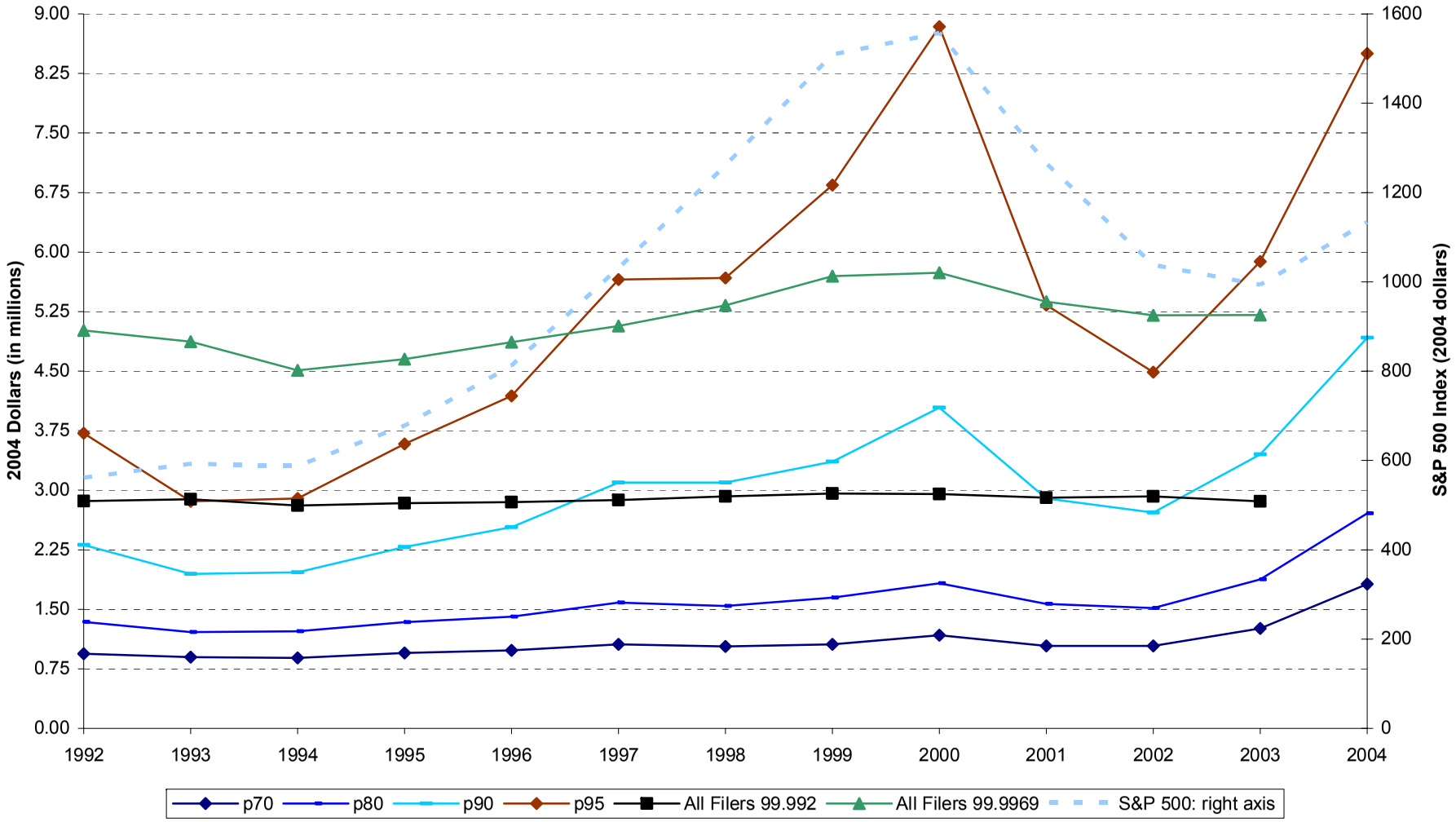
Source: Calculations are based on data from the Statistics of Income. Measures are in 2004 dollars.
Mean income corresponds to the right axis. The S&P 500 is adjusted to 2004 dollars, but is superimposed on the graph and does not correspond to either axis.
All other measures use the left axis.

Figure 2.3. ExecuComp Earned Income Distribution Compared to the Top One Percent of Tax Filers



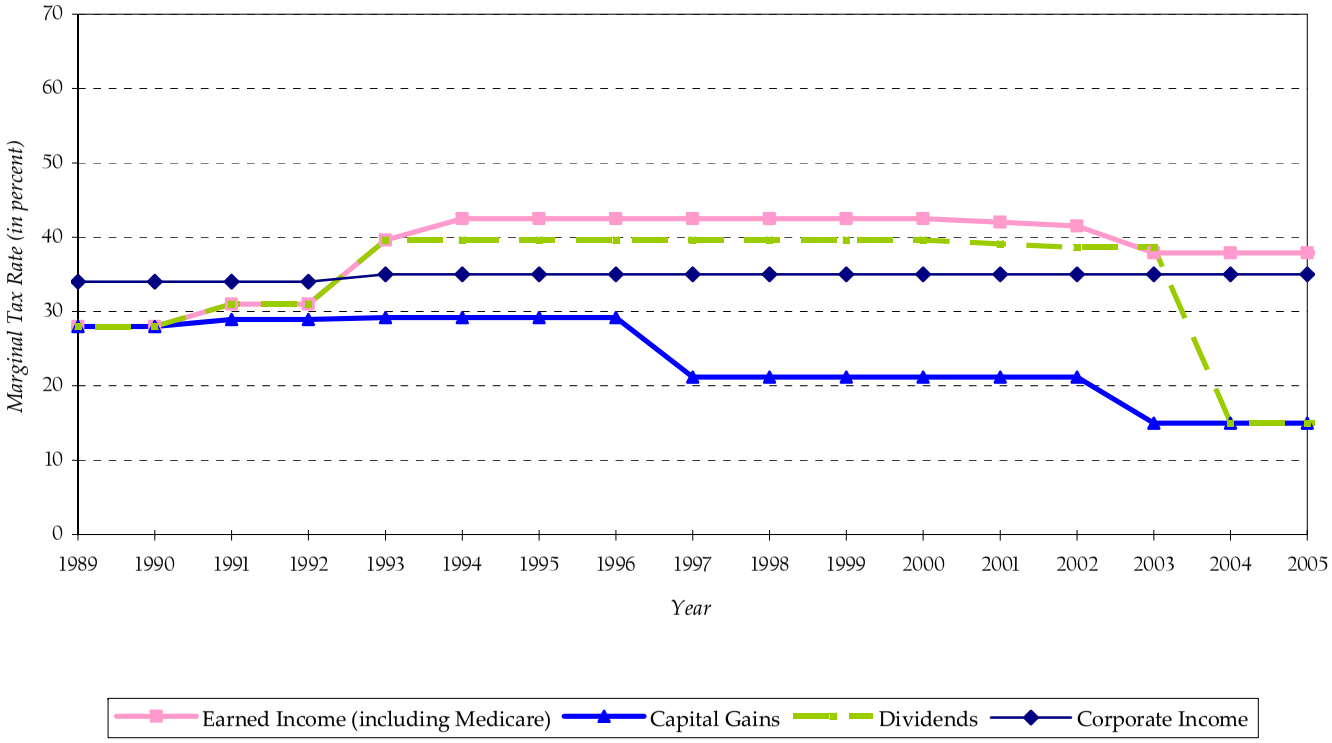
Source: Calculations are based on data from the Statistics of Income and the Executive Compensation Database. Measures are in 2004 dollars.

Figure 2.4. Earned income Trends from the ExecuComp at Various Percentiles



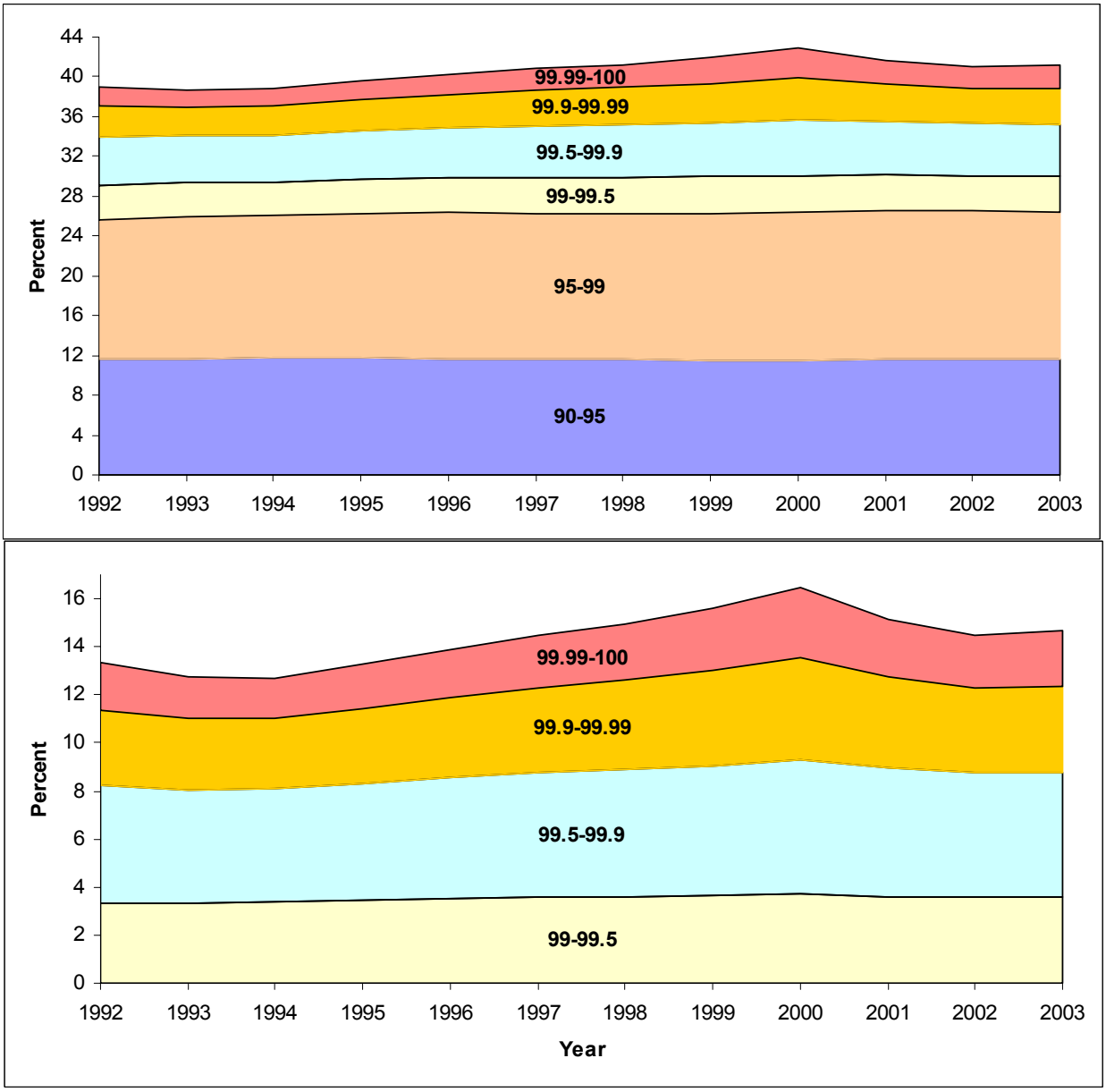
Source: Calculations are based on data from the Statistics of Income and the Executive Compensation Database. Measures are in 2004 dollars.

Figure 3.1. Top Federal Marginal Tax Rates on Earned Income, Capital Gains and Dividends, 1989-2005



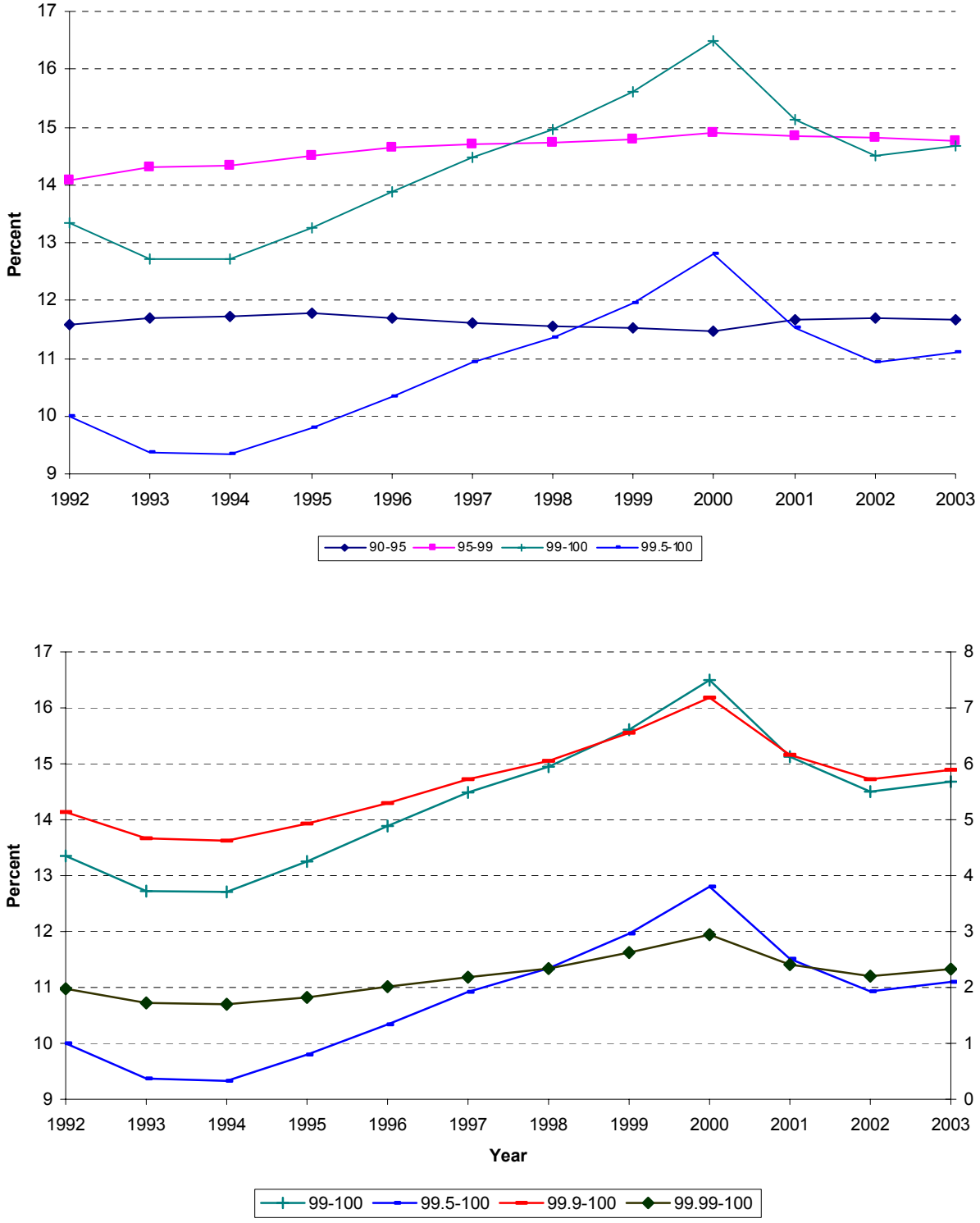
Source: Rates are based on IRS tax schedules.

Figure A.1. Gross Income Shares for the Top Decile of Tax Returns



Source: Calculations are based on data from the Statistics of Income. Measures are in 2004 dollars.

Figure A.2. Gross Income Shares for Top Fractiles



Source: Calculations are based on data from the Statistics of Income. Measures are in 2004 dollars.

Table 2.1. Overview of Samples from the Statistics of Income and the Executive Compensation Database (in 2004 Dollars)

	SOI	ExecuComp
Observations[a]	314,020	58,394
Number of Individuals	97,336	10,179
Observations with Earned Income Greater than:		
$1,000,000	166,040	17,383
$5,000,000	37,062	2,731
Mean Taxable Income	$3,368,452	--
Median Taxable Income	$1,629,189	--
Mean Earned Income	$2,771,331	$1,928,376
Median Earned Income	$946,203	$789,961
Mean Gross Income	$4,111,668	--
Median Gross Income	$1,722,150	--
Total Compensation	--	$2,619,757
Mean Federal Tax Rate	41.20	40.96
Mean State Tax Rate	5.75	5.90
Mean After-Tax Share	53.05	53.33

Source: Estimates are based on Statistics of Income data for years 1992 to 2003 and on the Executive Compensation Database for years 1992 to 2004.

a. Samples include observations used for the regression analysis and exclude individuals with average salaried income of less than $376,000.

Table 2.2. 1998 ExecuComp Data Compared to SOI Statistics Reported by Piketty and Saez (1998)
Panel 1

Gross Income	1998 SOI Percentile	1998 ExecuComp Percentile
$94,682	90.00	1.2
$124,465	95.00	1.9
$266,778	99.00	13.2
$366,327	99.50	24.3
$915,991	99.90	60.1
$4,195,782	99.99	91.6

Source: Columns 1 and 2 are from Piketty and Saez(2003). Column 1 is inflated by the CPI to 2004 dollars. Column 3 is based on estimates from the Executive Compensation Database. Incomes exclude capital gains.

Panel 2

Piketty and Saez: 1998 SOI			1998 ExecuComp: Gross Income (Less Capital Gains) by Decile		
Fractile	Number of Tax Units	Average Gross Income	Decile	Number of Indivduals	Average Gross Income
0 to 100	130,945,000	$44,896	Observations	6,404	$1,915,454
90 - 95	6,550,000	$108,936	0 - 10	640	$157,698
95 - 99	5,240,000	$165,722	10 - 20	640	$270,075
90 - 99	11,790,000	$134,175	20 - 30	641	$364,288
99 - 99.5	655,000	$309,425	30 - 40	640	$474,067
99.5 - 99.9	524,000	$572,494	40 - 50	641	$604,634
99.9 - 99.99	117,900	$1,726,755	50 - 60	640	$779,712
99.99 - 100	13,100	$11,554,190	60 - 70	640	$1,052,754
			70 - 80	641	$1,530,465
			80 - 90	640	$2,670,219
			90 – 95	320	$5,037,642
			95 – 100	321	$17,425,295

Source: Columns 1, 2, and 3 are from Piketty and Saez(2003). Columns 1 and 3 are inflated by the CPI to 2004 dollars. Columns 4 to 6 are based on the Executive Compensation Database and are in 2004 dollars. Incomes exclude capital gains.
For the ExecuComp, gross income is defined as earned income plus categories for other income and restricted stock grants. The ExecuComp definition of earned in come is: earned income = salary + bonus income + long-term incentive payouts + value of exercised options.
The ExecuComp sample includes all 1998 observations for executives with fiscal years ending in December.

Table 2.3: Mean ExecuComp Incomes, by Sources ('000s)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Observations	3,311	4,010	4,364	4,773	5,151	5,732	6,404	6,602	6,720	6,888	6,965	6,477	5,206
Total Compensation	1,243	1,308	1,466	1,487	1,758	2,232	2,188	2,675	3,109	2,880	2,366	2,238	2,665
Salary	399	390	391	384	378	375	380	386	393	401	405	420	454
Bonus	223	249	293	304	327	356	332	377	403	334	377	434	565
LTIP	90	67	74	95	123	124	106	108	122	82	89	119	136
Stock Grants	87	89	93	111	127	168	171	170	237	223	229	306	431
Other Income	71	105	75	98	106	132	110	132	173	132	147	138	164
Options Granted	374	408	541	495	698	1,078	1,090	1,502	1,780	1,707	1,118	819	914
Earned Income	1,158	969	1,011	1,116	1,308	1,610	1,639	1,834	2,344	1,646	1,391	1,735	2,436
Options Exercised	446	263	252	330	478	752	817	957	1,419	823	515	755	1,275

Source: Calculations are based on the Executive Compensation Database and are in 2004 dollars.
Only executives in firms with December fiscal year are included. For some observations, the value of options granted and exercised is imputed.

Table 2.4. Earned Income Percentiles for the SOI and the ExecuComp
SOI Earned Income (in thousands of 2004 dollars)

Year	mean	med	p90	p95	p99	p99.5	p99.9	p99.992	p99.9969
1992	33,269	20,900	76,275	99,280	179,627	252,266	589,350	2,863,809	5,013,939
1993	32,977	20,698	75,832	98,599	181,092	250,983	557,271	2,886,706	4,870,008
1994	33,233	20,979	76,833	99,631	181,774	253,329	542,576	2,808,037	4,510,504
1995	33,527	20,803	77,325	101,804	188,423	262,590	576,636	2,837,240	4,652,208
1996	33,772	20,695	77,273	102,622	193,052	271,654	604,040	2,848,665	4,865,123
1997	34,696	21,316	78,738	104,771	202,220	283,757	648,992	2,875,861	5,068,009
1998	35,991	21,873	81,175	108,244	210,786	296,673	693,286	2,920,809	5,328,912
1999	36,870	22,023	82,529	110,349	218,939	308,244	726,269	2,957,802	5,695,583
2000	37,818	22,263	83,862	112,437	226,429	319,101	801,344	2,952,381	5,738,696
2001	37,350	22,541	84,160	113,900	222,052	310,119	725,270	2,905,586	5,373,966
2002	36,852	22,505	84,046	112,319	214,802	301,487	679,644	2,922,191	5,202,465
2003	36,913	22,488	84,722	112,684	215,097	300,760	678,184	2,860,810	5,205,583
Mean	35,272	21,590	80,231	106,387	202,858	284,247	651,905	2,886,658	5,127,083
Mean Growth	304	132	704	1,117	2,956	4,041	7,403	(250)	15,970
Percent Change	0.913	0.633	0.923	1.125	1.645	1.602	1.256	-0.009	0.319

Source: Estimates are based on Statistics of Income data.

ExecuComp Earned Income

	p10	p20	p30	p40	med	p60	p70	p80	p90	p95
1992	207,009	283,763	349,326	439,497	539,978	706,860	938,751	1,341,815	2,310,679	3,719,214
1993	211,727	287,533	353,200	435,904	544,427	700,845	898,190	1,213,960	1,947,329	2,860,201
1994	214,138	290,303	358,999	446,120	543,056	693,875	888,369	1,223,644	1,966,506	2,894,290
1995	210,715	285,229	363,484	458,975	573,885	720,567	950,173	1,336,678	2,284,196	3,582,737
1996	216,711	298,763	368,478	453,858	570,939	735,497	983,249	1,406,548	2,535,614	4,188,589
1997	219,953	299,262	376,623	477,352	592,563	773,893	1,059,252	1,584,712	3,095,420	5,653,761
1998	209,089	287,092	366,559	463,558	581,461	752,392	1,032,904	1,543,143	3,097,916	5,674,752
1999	220,480	302,739	379,841	477,969	606,829	784,976	1,059,019	1,647,666	3,359,254	6,844,593
2000	229,510	303,800	392,166	504,266	635,853	837,258	1,173,769	1,829,075	4,039,662	8,838,380
2001	223,089	298,656	374,173	473,944	592,742	770,516	1,039,963	1,567,391	2,897,168	5,333,145
2002	230,481	311,170	393,824	495,689	619,516	782,387	1,037,973	1,515,559	2,717,507	4,487,471
2003	255,118	338,424	437,113	563,746	716,709	940,156	1,258,781	1,876,118	3,450,388	5,882,142
2004	311,667	435,000	574,676	733,147	972,500	1,301,092	1,816,723	2,707,758	4,921,470	8,500,001
Mean	227,668	309,364	391,420	494,156	622,343	807,716	1,087,471	1,599,544	2,971,008	5,266,098

Source: Calculations are based on the Executive Compensation Database and are in 2004 dollars.
Only executives in firms with December fiscal year are included.

Table 2.5. Percent Change in Earned Income for Various Percentiles of the SOI and the ExecuComp

SOI Earned Income (in thousands of 2004 dollars)

Year	mean	med	p90	p95	p99	p99.5	p99.9	p99.992	p99.9969
1993	-0.88	-0.97	-0.58	-0.69	0.82	-0.51	-5.44	0.80	-2.87
1994	0.78	1.36	1.32	1.05	0.38	0.93	-2.64	-2.73	-7.38
1995	0.88	-0.84	0.64	2.18	3.66	3.66	6.28	1.04	3.14
1996	0.73	-0.52	-0.07	0.80	2.46	3.45	4.75	0.40	4.58
1997	2.74	3.00	1.90	2.09	4.75	4.46	7.44	0.95	4.17
1998	3.73	2.61	3.10	3.31	4.24	4.55	6.83	1.56	5.15
1999	2.44	0.69	1.67	1.94	3.87	3.90	4.76	1.27	6.88
2000	2.57	1.09	1.62	1.89	3.42	3.52	10.34	-0.18	0.76
2001	-1.24	1.25	0.36	1.30	-1.93	-2.81	-9.49	-1.58	-6.36
2002	-1.33	-0.16	-0.14	-1.39	-3.27	-2.78	-6.29	0.57	-3.19
2003	0.17	-0.08	0.80	0.32	0.14	-0.24	-0.21	-2.10	0.06
Total Growth	10.95	7.60	11.07	13.50	19.75	19.22	15.07	-0.10	3.82

Source: Estimates are based on Statistics of Income data.

ExecuComp Earned Income

	p10	p20	p30	p40	med	p60	p70	p80	p90	p95
1993	2.28	1.33	1.11	-0.82	0.82	-0.85	-4.32	-9.53	-15.72	-23.10
1994	1.14	0.96	1.64	2.34	-0.25	-0.99	-1.09	0.80	0.98	1.19
1995	-1.60	-1.75	1.25	2.88	5.68	3.85	6.96	9.24	16.16	23.79
1996	2.85	4.74	1.37	-1.11	-0.51	2.07	3.48	5.23	11.01	16.91
1997	1.50	0.17	2.21	5.18	3.79	5.22	7.73	12.67	22.08	34.98
1998	-4.94	-4.07	-2.67	-2.89	-1.87	-2.78	-2.49	-2.62	0.08	0.37
1999	5.45	5.45	3.62	3.11	4.36	4.33	2.53	6.77	8.44	20.61
2000	4.10	0.35	3.24	5.50	4.78	6.66	10.84	11.01	20.25	29.13
2001	-2.80	-1.69	-4.59	-6.01	-6.78	-7.97	-11.40	-14.31	-28.28	-39.66
2002	3.31	4.19	5.25	4.59	4.52	1.54	-0.19	-3.31	-6.20	-15.86
2003	10.69	8.76	10.99	13.73	15.69	20.17	21.27	23.79	26.97	31.08
2004	22.17	28.54	31.47	30.05	35.69	38.39	44.32	44.33	42.64	44.51
Total Growth	50.56	53.30	64.51	66.82	80.10	84.07	93.53	101.80	112.99	128.54

Source: Calculations are based on the Executive Compensation Database and are in 2004 dollars.

Only executives in firms with December fiscal years are included.

Table 3.1. Statutory Federal Marginal Income Tax Rates for Highest-Income Taxpayers

	Top Marginal Tax Rate (percent)	Income Threshold	Next Marginal Rate	Income Threshold
1992	31.0	$ 86,500	28.0	
1993	39.6	250,000	36.0	$ 140,000
1994	42.5	250,000	38.9	140,000
1995	42.5	256,500	38.9	143,600
1996	42.5	263,750	38.9	147,700
1997	42.5	271,050	38.9	151,750
1998	42.5	278,450	38.9	155,950
1999	42.5	283,150	38.9	158,550
2000	42.5	288,350	38.9	161,450
2001	42.0	297,350	38.4	166,500
2002	41.5	307,050	37.9	171,950
2003	37.9	311,950	35.9	174,700
2004	37.9	319,100	35.9	178,600

Source: Internal Revenue Service.

Table 4.1

ExecuComp Earned Income Elasticities
Long-Term Executives

	1992 to 2004	1992 to 1995	2000 to 2004	1992 to 2004	1992 to 1995	2000 to 2004
	(1)	(2)	(3)	(4)	(5)	(6)
After-Tax Share Current	0.336	0.481	1.09	1.092	0.821	-0.005
	(0.068)	(0.140)	(0.353)	(0.108)	(0.319)	(0.340)
After-Tax Share Future				-1.458	-0.633	-0.691
				(0.184)	(0.688)	(0.302)
Year	0.121	0.14	0.108	0.119	0.129	0.126
	(0.001)	(0.010)	(0.010)	(0.002)	(0.013)	(0.011)
Million–Dollar Rule				-3.341	14.684	-0.559
				(0.865)	(4.225)	(1.233)
Firm Market Value				0.191	0.193	0.239
				(0.003)	(0.011)	(0.010)
Earnings/Asset				1.371	1.764	1.399
				(0.038)	(0.135)	(0.083)
Constant	-236.733	-274.942	-213.294	-231.023	-254.482	-244.646
	(2.428)	(21.399)	(18.082)	(3.379)	(25.494)	(21.175)
Observations	46,754	7,752	13,517	46,754	7,752	13,517
Number of executives	6,234	1,938	2,707	6,234	1,938	2,707
R-squared	0.20	0.08	0.09	0.28	0.14	0.17

Source: Estimates are based on the Executive Compensation Database. Only those with permanent incomes greater than $376,000 are included in the regressions. Sample includes executives who appear in at least 4 consecutive years.
Standard errors are in parentheses. All specifications include individual fixed-effects.

Table 4.2
Attrition in the ExecuComp

Years in Sample	Number of Executives	Share
1	529	0.05
2	1,079	0.10
3	2,151	0.19
4	1,595	0.14
5	1,223	0.11
6	935	0.08
7	919	0.08
8	731	0.07
9	535	0.05
10	395	0.04
11	295	0.03
12	291	0.03
13	534	0.05
Total	11,212	1.00

Source: Estimates are based on the Executive Compensation Database. Only those with permanent incomes greater than $376,000 are included in the regressions.

Table 4.3

ExecuComp Earned-Income Elasticities
All Executives

	1992 to 2004	1992 to 1995	2000 to 2004	1992 to 2004	1992 to 1995	2000 to 2004
	(1)	(2)	(3)	(4)	(5)	(6)
After-Tax Share Current	0.574	1.001	2.404	1.330	1.217	0.968
	(0.062)	(0.121)	(0.269)	(0.096)	(0.281)	(0.261)
After-Tax Share Future				-1.617	-0.640	-1.481
				(0.168)	(0.613)	(0.233)
Year	0.126	0.184	0.083	0.125	0.168	0.133
	(0.001)	(0.009)	(0.008)	(0.002)	(0.011)	(0.009)
Million Dollar				-3.469	15.906	-2.558
				(0.864)	(3.866)	(1.127)
Firm Market Value				0.183	0.153	0.207
				(0.003)	(0.009)	(0.007)
Earnings/Assets				1.252	1.469	1.227
				(0.033)	(0.104)	(0.052)
Constant	-247.167	-364.614	-168.261	-242.913	-333.108	-258.048
	(2.388)	(18.608)	(14.327)	(3.206)	(22.338)	(17.196)
Observations	58,394	11,677	26,065	58,394	11,677	26,065
Number of Executives	10,179	3,743	7,394	10,179	3,743	7,394
R-squared	0.19	0.09	0.08	0.26	0.14	0.16

Source: Estimates are based on the Executive Compensation Database. Only those with permanent incomes greater than $376,000 are included in the regressions.
Standard errors are in parentheses. All specifications include individual fixed-effects.

Table 4.4

Statistics of Income
Earned-Income Elasticities

	1992 to 2003	1992 to 1995	2000 to 2003	1992 to 2003	1992 to 1995	2000 to 2003
	(1)	(2)	(3)	(4)	(5)	(6)
After-Tax Share Current	3.224	3.308	3.289	-0.829	-0.233	-5.603
	(0.002)	(0.003)	(0.003)	(0.051)	(0.318)	(0.300)
After-Tax Share Future				2.855	-0.217	6.035
				(0.057)	(0.324)	(0.198)
Year	0.016	0.184	-0.139	-0.068	-0.137	-0.165
	(0.001)	(0.002)	(0.002)	(0.001)	(0.015)	(0.008)
Million–Dollar Rule				-2.75	-17.305	-0.817
				(0.075)	(1.576)	(0.063)
S&P 500				0.755	3.914	1.787
				(0.015)	(0.115)	(0.064)
PE Ratio_Market				-0.007	-0.445	-0.040
				(0.001)	(0.018)	(0.002)
Observations	314,020	68,300	128,333	314,020	68,300	128,333
Tax Units	97,366	30,609	63,205	97,366	30,609	63,205
R-squared	0.87	0.96	0.91	0.88	0.96	0.91

Source: Estimates are based on the Statistics of Income.
Only those with permanent incomes greater than $376,000 are included in the regressions. Weights are used to adjust for non-random selection into the sample. Standard errors are in parentheses. All specifications include individual fixed-effects.

Table 4.5

ExecuComp Total Compensation Elasticities
Long-Term Executives

	1992 to 2004	1992 to 1995	2000 to 2004	1992 to 2004	1992 to 1995	2000 to 2004
	(1)	(2)	(3)	(4)	(5)	(6)
After-Tax Share, Current	-0.949	-0.243	-0.323	0.100	-0.668	-0.896
	(0.060)	(0.121)	(0.298)	(0.100)	(0.285)	(0.294)
After-Tax Share, Future				-2.118	1.093	-0.238
				(0.168)	(0.614)	(0.261)
Million-Dollar Rule				-3.004	0.430	-0.318
				(0.800)	(3.773)	(1.068)
Firm Market Value				0.101	0.047	0.166
				(0.003)	(0.010)	(0.009)
Earnings/Assets				0.548	0.780	0.180
				(0.035)	(0.121)	(0.072)
Year	0.101	0.099	0.042	0.109	0.082	0.044
	(0.001)	(0.009)	(0.008)	(0.002)	(0.012)	(0.010)
Constant	-190.177	-188.795	-76.121	-203.912	-157.967	-78.021
	(2.164)	(18.513)	(15.240)	(3.112)	(22.768)	(18.320)
Observations	46,852	7,752	13,554	46,852	7,752	13,554
Number of Executives	6,237	1,938	2,711	6,237	1,938	2,711
R-squared	0.18	0.11	0.01	0.21	0.12	0.04

Source: Estimates are based on the Executive Compensation Database. Only those with permanent incomes greater than $376 thousand are included in the regressions. Standard errors are in parentheses. All specifications include individual fixed-effects.

Table 4.6

Statistics of Income
Taxable-Income Elasticities

	1992 to 2003	1992 to 1995	2000 to 2003	1992 to 2003	1992 to 1995	2000 to 2003
	(1)	(2)	(3)	(4)	(5)	(6)
After-Tax Share, Current	3.271	3.321	3.301	-1.039	0.224	-5.344
	(0.002)	(0.004)	(0.004)	0.056	(0.443)	(0.383)
After-Tax Share, Future				3.227	-0.072	5.981
				0.063	(0.452)	(0.253)
Year	0.034	0.206	-0.124	-0.051	-0.074	-0.133
	(0.001)	(0.003)	(0.002)	0.001	(0.021)	(0.010)
Million-Dollar Rule				-2.018	-15.555	-0.737
				0.082	(2.199)	(0.081)
S&P 500				0.679	3.305	1.651
				0.017	(0.161)	(0.082)
PE Ratio_Market				-0.005	-0.376	-0.035
				0.001	(0.025)	(0.002)
	299,124	64,780	122,191	299,124	64,780	122,191
Observations	95,066	29,508	61,433	95,066	29,508	61,433
Tax units	0.86	0.93	0.87	0.87	0.93	0.87
R-squared						

Source: Estimates are based on the Statistics of Income. Only those with permanent incomes greater than $376 thousand are included in the regressions. Weights are used to adjust for non-random selection into the sample. Standard errors are in parentheses. All specifications include individual fixed- effects.

Table 4.7

Statistics of Income
Gross Income Elasticities

	1992 to 2003	1992 to 1995	2000 to 2003	1992 to 2003	1992 to 1995	2000 to 2003
	(1)	(2)	(3)	(4)	(5)	(6)
After-Tax Share, Current	3.316	3.367	3.353	-0.754	0.787	-5.884
	(0.002)	(0.003)	(0.003)	(0.042)	(0.350)	(0.278)
After-Tax Share, Future				3.17	-0.984	6.234
				(0.047)	(0.358)	(0.184)
Year	0.041	0.22	-0.11	-0.035	-0.047	-0.13
	(0.0005)	(0.002)	(0.002)	(0.001)	(0.016)	(0.008)
Million-Dollar Rule				-1.628	-19.327	-0.565
				(0.062)	(1.738)	(0.059)
S&P 500				0.562	3.797	1.869
				(0.013)	(0.127)	(0.060)
PE Ratio_Market				-0.004	-0.448	-0.04
				(0.001)	(0.020)	(0.001)
Observations	300,747	65,478	123,826	300,747	65,478	123,826
Tax units	0.92	0.95	0.93	0.93	0.96	0.93
R-squared						

Source: Estimates are based on the Statistics of Income. Only those with permanent incomes greater than $376 thousand are included in the regressions. Weights are used to adjust for non-random selection into the sample. Standard errors are in parentheses. All specifications include individual fixed-effects.

Table 4.8
Earned-Income Elasticities
by Income Level

Panel A: Long-Term Executives

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Mean Income Floor		**$376,000**			**$650,000**			**$1,000,000**	
	All	1992-1995	2000-2004	All	1992-1995	2000-2004	All	1992-1995	2000-2004
After-Tax Share, Current	1.092	0.821	-0.005	1.347	1.047	0.019	1.714	1.481	0.602
	(0.108)	(0.319)	(0.340)	(0.133)	(0.429)	(0.431)	(0.167)	(0.542)	(0.541)
After-Tax Share, Future	-1.458	-0.633	-0.691	-1.898	-0.398	-0.977	-2.541	-0.747	-1.312
	(0.184)	(0.688)	(0.302)	(0.231)	(0.429)	(0.379)	(0.293)	(1.150)	(0.474)
Observations	46,754	7,752	13,517	35,376	5,396	10,576	25,279	3,616	7,915
Number of Executives	6,234	1,938	2,707	4,587	1,349	2,117	3,219	904	1,586
R-squared	0.20	0.08	0.09	0.30	0.14	0.18	0.30	0.12	0.18

Panel B: All Executives

Mean Income Floor		**$376,000**			**$650,000**			**$1,000,000**	
	All	1992-1995	2000-2004	All	1992-1995	2000-2004	All	1992-1995	2000-2004
After-Tax Share, Current	1.330	1.217	0.968	1.617	1.558	1.213	2.077	2.009	1.755
	(0.096)	(0.281)	(0.261)	(0.121)	(0.391)	(0.346)	(0.156)	(0.509)	(0.443)
After-Tax Share, Future	-1.617	-0.640	-1.480	-2.117	-0.824	-1.807	-2.893	-1.361	-2.229
	(0.168)	(0.613)	(0.233)	(0.217)	(0.851)	(0.307)	(0.279)	(1. 076)	(0.443)
Observations	58,394	11,677	26,065	42,342	7,627	18,959	29,461	4,886	13,521
Number of Executives	10,179	3,743	7,394	6,904	2,346	5,236	4,607	1,455	3,676
R-squared	0.26	0.14	0.16	0.28	0.13	0.17	0.29	0.11	0.18

Source: Estimates are based on the Executive Compensation Database.
Standard errors are in parentheses. All specifications include individual fixed-effects.

Table 4.9
Income Elasticities by Income Type

Panel A: Long-Term Executives

	Earned Income			Wages and Salary Income			Long-Term Incentive Payouts		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	1992-1995	2000-2004	All	1992-1995	2000-2004	All	1992-1995	2000-2004
After-Tax Share, Current	1.092	0.821	-0.005	0.235	-0.444	-0.392	-0.698	1.093	1.645
	(0.108)	(0.319)	(0.340)	(0.077)	(0.123)	(0.186)	(0.277)	(0.782)	(0.656)
After-Tax Share, Future	-1.458	-0.633	-0.691	-0.219	0.267	0.375	0.533	-0.730	-0.194
	(0.184)	(0.688)	(0.302)	(0.131)	(0.266)	(0.165)	(0.412)	(1.056)	(0.629)
Observations	46,754	7,752	13,517	46,871	7,752	13,560	38,921	6,720	11,480
Number of Executives	6,234	1,938	2,707	6,237	1,938	2,712	4,949	1,680	2,296
R-squared	0.20	0.08	0.09	0.11	0.16	0.06	0.05	0.01	0.05

Panel B: All Executives

	Earned Income			Wages and Salary Income			Long-Term Incentive Payouts		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
	All	1992-1995	2000-2004	All	1992-1995	2000-2004	All	1992-1995	2000-2004
After-Tax Share, Current	1.330	1.217	0.968	0.354	-0.123	-0.001	-0.308	2.335	2.100
	(0.096)	(0.281)	(0.261)	(0.067)	(0.131)	(0.143)	(0.233)	(0.650)	(0.449)
After-Tax Share, Future	-1.617	-0.640	-1.48	-0.226	0.453	-0.118	-0.285	-1.521	-0.660
	(0.168)	(0.613)	(0.233)	0.116	(0.286)	(0.128)	(0.345)	(0.861)	(0.435)
Observations	58,394	11,677	26,065	58,550	11,695	26,161	49,975	10,181	22,260
Number of Executives	10,179	3,743	7,394	10,195	3,753	7,415	8,715	3,275	6,343
R-squared	0.26	0.14	0.16	0.11	0.1	0.06	0.045	0.07	0.045

Source: Estimates are based on the Executive Compensation Database. Only those with permanent incomes greater than $376,000 are included in the regressions. Standard errors are in parentheses. All specifications include individual fixed-effects.

Table 4.10
Income Elasticities

	Basic Sample (In>1 years) 1992-2004		Long-Term Executives (In >=4 years) ExecuComp, 1992-2004							
	Data		Time Period			Income Level		Income Source		
	(1) ExecuComp	(2) SOI	(3) All Years	(4) OBRA 93 (1992-1995)	(5) EGGTRA (2000-2004)	(6) High Income (>$650K)	(7) Very High Income (>$1million)	(8) Total Compensation	(9) Wage & Salary	(10) Long-Term Incentive Payouts
After-Tax Share, Current	1.330	-0.829	1.092	0.821	-0.005	1.347	1.714	0.129	0.088	-0.698
	(0.096)	(0.051)	(0.108)	(0.319)	(0.340)	(0.133)	(0.167)	(0.064)	(0.071)	(0.277)
After-Tax Share, Future	-1.617	2.855	-1.458	-0.633	-0.691	-1.898	-2.541	-2.195	0.124	0.533
	(0.125)	(0.057)	(0.184)	(0.688)	(0.302)	(0.231)	(0.293)	(0.177)	(0.122)	(0.412)
Observations	58,394	314,020	46,754	7,752	13,157	35,376	25,279	46,754	38,799	38,982
Execs/Tax Units	10,179	97,336	6,234	1,938	2,707	4,587	3,219	6,234	4,941	4,949

Source: Estimates are based on the Executive Compensation Database. Standard errors are in parentheses. All specifications include individual fixed-effects.

Table 5.1
Composition of Executive Compensation
Share Regressions

	Stock Options				Restricted Stock			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Executives		Long-Term Executives		All Executives		Long-Term Executives	
After-Tax Share								
Earned Income	-0.45	-0.38	-0.49	-0.44	0.11	0.08	0.11	0.09
	(0.02)	(0.21)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Capital Gains	0.18	0.18	0.20	0.20	0.003	-0.04	-0.02	-0.06
	(0.04)	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	(0.02)	(0.02)
Corporate	-0.18	-0.22	-0.34	-0.38	-0.05	0.05	-0.02	0.07
	(0.30)	(0.30)	(0.29)	(0.30)	(0.15)	(0.16)	(0.15)	(0.16)
Firm Market Value	0.01	0.02	0.01	0.02	0.01	0.00	-0.01	0.00
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.00)	(0.01)	(0.00)
Earnings/Assets	-0.03	-0.03	-0.01	-0.02	0.01	0.01	0.01	0.02
	(0.01)	(0.02)	(0.013)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Volatility		0.10		0.01		-0.02		-0.02
		(0.01)		(0.005)		(0.01)		(0.01)
Director Fee		-0.01		-0.01		0.00		0.00
		(0.003)		(0.003)		(0.00)		(0.000
Year	-0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
	(0.00)	(0.001)	(0.00)	(0.001)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	2.31	-8.34	-.139	-10.06	-7.01	-6.56	-7.28	-7.19
	(1.39)	(1.54)	(1.43)	(1.60)	(0.71)	(0.80)	(0.75)	0.85
Observations	49,951	43,796	38,909	34,295	49,951	43,796	38,909	34,295
Number of Executives	8,712	8,507	4,949	4,913	8,712	8,507	4,949	4,913
R-squared	0.01	0.03	0.02	0.04	0.01	0.01	0.01	0.01

Source: Estimates are based on the Executive Compensation Database. Only those with permanent incomes greater than $376 thousand are included in the regressions. Standard errors are in parentheses. All specifications include individual fixed-effects.

Table A.1. Income Shares for Fractiles in the Top Decile

Income Shares: Gross Income (Excluding Capital Gains)

Year	90-100	95-100	99-100	99.5-100	99.9-100	99.99-100	90-95	95-99	99-99.5	99.5-99.9	99.9-99.99	99.99-100
1992	39.02	27.43	13.35	10.00	5.14	1.98	11.58	14.08	3.35	4.86	3.16	1.97
1993	38.72	27.02	12.72	9.37	4.67	1.72	11.70	14.30	3.35	4.70	2.94	1.72
1994	38.76	27.04	12.71	9.33	4.63	1.70	11.72	14.33	3.38	4.70	2.93	1.70
1995	39.54	27.76	13.25	9.80	4.93	1.82	11.78	14.51	3.45	4.87	3.11	1.82
1996	40.23	28.53	13.89	10.34	5.30	2.01	11.70	14.64	3.55	5.04	3.28	2.01
1997	40.80	29.18	14.49	10.92	5.72	2.18	11.62	14.69	3.57	5.20	3.54	2.18
1998	41.24	29.67	14.95	11.34	6.05	2.34	11.56	14.73	3.61	5.29	3.71	2.34
1999	41.93	30.40	15.61	11.96	6.55	2.62	11.53	14.79	3.64	5.41	3.93	2.62
2000	42.85	31.39	16.50	12.80	7.18	2.94	11.46	14.89	3.69	5.62	4.24	2.94
2001	41.63	29.96	15.13	11.51	6.16	2.41	11.67	14.83	3.62	5.35	3.75	2.41
2002	41.02	29.32	14.50	10.93	5.72	2.20	11.70	14.82	3.57	5.20	3.52	2.20
2003	41.10	29.43	14.68	11.10	5.89	2.33	11.67	14.75	3.58	5.21	3.56	2.32

Income Shares: Taxable Income (Excluding Capital Gains)

Year	90-100	95-100	99-100	99.5-100	99.9-100	99.99-100	90-95	95-99	99-99.5	99.5-99.9	99.9-99.99	99.99-100
1992	48.56	35.04	18.01	13.76	7.29	2.85	13.52	17.03	4.25	6.48	4.44	2.84
1993	48.18	34.39	16.95	12.70	6.48	2.41	13.79	17.44	4.26	6.22	4.07	2.40
1994	47.90	34.22	16.80	12.53	6.36	2.35	13.69	17.42	4.26	6.17	4.02	2.34
1995	48.52	34.90	17.41	13.09	6.71	2.50	13.62	17.49	4.32	6.38	4.22	2.49
1996	48.98	35.55	18.04	13.62	7.10	2.70	13.42	17.52	4.42	6.53	4.40	2.69
1997	49.32	36.08	18.65	14.25	7.57	2.88	13.24	17.43	4.40	6.69	4.68	2.88
1998	49.43	36.36	19.06	14.65	7.93	3.07	13.07	17.31	4.41	6.72	4.86	3.06
1999	50.04	37.06	19.76	15.33	8.51	3.40	12.98	17.30	4.43	6.83	5.10	3.40
2000	50.82	37.98	20.70	16.25	9.23	3.78	12.84	17.28	4.45	7.02	5.45	3.78
2001	49.61	36.47	19.11	14.72	7.98	3.11	13.14	17.36	4.39	6.74	4.87	3.11
2002	49.46	36.17	18.64	14.23	7.58	2.90	13.29	17.53	4.40	6.66	4.67	2.90
2003	49.50	36.25	18.83	14.42	7.76	3.05	13.25	17.42	4.41	6.66	4.71	3.05

(continued)

Income Shares: Earned Income

Year	90-100	95-100	99-100	99.5-100	99.9-100	99.99-100	90-95	95-99	99-99.5	99.5-99.9	99.9-99.99	99.99-100
1992	39.19	26.21	11.29	8.15	3.88	1.39	12.98	14.93	3.14	4.27	2.49	1.39
1993	38.85	25.84	10.79	7.61	3.43	1.13	13.01	15.05	3.17	4.18	2.31	1.12
1994	38.54	25.49	10.45	7.28	3.15	0.99	13.06	15.03	3.17	4.13	2.16	0.98
1995	39.48	26.36	11.07	7.80	3.50	1.16	13.11	15.30	3.27	4.30	2.34	1.16
1996	40.11	27.06	11.63	8.29	3.82	1.34	13.04	15.43	3.34	4.47	2.48	1.34
1997	40.62	27.65	12.22	8.83	4.28	1.59	12.97	15.43	3.39	4.55	2.69	1.58
1998	41.12	28.26	12.82	9.41	4.76	1.89	12.86	15.44	3.41	4.65	2.86	1.89
1999	41.82	29.00	13.54	10.09	5.36	2.29	12.81	15.46	3.45	4.74	3.07	2.28
2000	42.77	30.06	14.56	11.07	6.20	2.74	12.71	15.50	3.49	4.87	3.46	2.73
2001	41.66	28.69	13.01	9.55	4.90	1.97	12.97	15.67	3.46	4.65	2.92	1.97
2002	40.90	27.84	12.17	8.77	4.25	1.60	13.06	15.67	3.40	4.52	2.65	1.60
2003	40.88	27.79	12.14	8.76	4.26	1.62	13.09	15.64	3.39	4.49	2.64	1.61

Source: Calculations are based on the Statistics of Income.

Table A.2. Changes in Gross Income for Top Fractiles for Selected Time Periods

Panel 1. Average Annual Percent Change in Gross Income for Fractiles in the Top Decile

Year	0-100	90-100	95-100	99-100	99.5-100	99.9-100	99.99-100
1992-1994	-0.3	-0.5	-0.7	-1.9	-2.5	-3.5	-4.9
1994-2000	2.5	4.3	5.2	7.5	8.7	11.8	14.8
1998-2000	1.8	3.2	3.8	5.4	6.3	8.4	10.9
2000-2003	-0.8	-1.8	-2.3	-3.5	-4.0	-5.2	-5.9
1992-2003	1.2	1.7	1.9	2.2	2.3	2.7	3.0

Source: Calculations are based on the Statistics of Income and changes are measured in constant dollars.
* Changes are measured on a per capita basis, to adjust for increase in the number of returns over time.

Panel 2. Total Percent Change in Gross Income for Fractiles in the Top Decile

Year	0-100	90-100	95-100	99-100	99.5-100	99.9-100	99.99-100	90-95	95-99	99-99.5	99.5-99.9	99.9-99.99	99.99-100
1992-1994	-0.8	-1.4	-2.2	-5.6	-7.4	-10.6	-14.8	0.4	0.9	0.0	-4.0	-8.1	-14.8
1994-2000	17.4	29.8	36.3	52.4	61.2	82.3	103.4	14.8	22.0	28.3	40.3	70.1	103.4
1998-2000	5.4	9.5	11.5	16.3	19.0	25.2	32.7	7.8	10.5	12.6	17.2	28.4	42.1
2000-2003	-3.3	-7.2	-9.3	-13.9	-16.2	-20.7	-23.5	-1.6	-4.2	-6.2	-10.4	-18.7	-23.5
1992-2003	14.1	20.8	23.3	26.7	28.0	32.6	36.4	15.1	20.1	22.7	23.1	30.3	36.4

Source: Calculations are based on the Statistics of Income and changes are measured in constant dollars.
* Changes are measured on a per capita basis, to adjust for increase in the number of returns over time.

Panel 3. Percent Change in Gross Income Shares for Top Fractiles

	90-95	95-99	99-99.5	99.5-99.9	99.9-99.99	99.99-100
1992-1994	1.2	1.8	0.8	-3.3	-7.3	-14.1
1994-2000	-2.2	3.9	9.2	19.5	44.9	73.4
1998-2000	-0.9	1.1	2.4	6.2	14.3	25.9
2000-2003	1.8	-1.0	-3.0	-7.3	-16.0	-20.9
1992-2003	0.8	4.7	6.8	7.1	12.8	17.7

Source: Calculations are based on the Statistics of Income and changes are measured in constant dollars.
* Changes are measured on a per capita basis, to adjust for increase in the number of returns over time.

Panel 4. Share of the Total Increase in Gross Income from 1992 to 2003 ($1.2 trillion) Accruing to Top Fractiles

Fractile	Share
top 10	49.21
top 5	37.19
top 1	19.86
top 0.5	15.39
top 0.1	8.83

Source: Calculations are based on the Statistics of Income.