

Tax Responsiveness of the Rich: Revisiting Evidence from Executive Compensation

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Abstract

This paper measures the responsiveness of taxable income to changes in the marginal tax rate using panel data on executive compensation since 1992. It exploits variation from four tax acts: the Omnibus Budget Reconciliation Act of 1993, the Economic Growth and Tax Relief Reconciliation Act of 2001, the Jobs and Growth Reconciliation Act of 2003, and the American Taxpayer Relief Act of 2012. Stock options have increased significantly as a share of compensation since 1992. I revisit results on the responsiveness of executives given this trend towards the use of options, and find a small short-run elasticity for executives, a larger short-run elasticity for CEOs specifically, and no long-run elasticity for either group.

Keywords: executive compensation, elasticity of taxable income, tax policy

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What happens when you tax the rich?¹ In 2014, the top 1% of taxpayers generated about 40% of federal income tax revenue. Therefore, changes to the tax code have more revenue impact when they are aimed at the rich than when they are aimed at the poor. While the lowest tax rate has only changed once since 1992, the top tax rate has changed four times. Each change spurs debate about progressivity and the distribution of the tax burden; efficiency and the size of the deadweight loss; and revenue implications and the accuracy of the estimated effects of the change.

Several problems confound estimation of a wealthy individual's response to a tax change. Researchers use random samples of tax returns, but those samples contain relatively few returns from the rich. Income is rising overall, which masks shorter term variation in income level that might be a response to a tax change. Finally, changes since the Tax Reform Act of 1986, which cut the top rate by more than 30%, have been small relative to that Act, and infrequent. So, if rich individuals are responding, their responses may be small and difficult to measure. Existing literature overcomes these problems by using panel data from the wealthy and exploiting variation in years with a policy change.

Most panel data measure the response of individuals in terms of taxable income, rather than hours worked or labor force participation. Taxable income is a measure that encompasses variation in effort and in what forms of compensation an individual receives. For example, instead of working fewer hours, individuals subject to a tax increase might ask for a more generous healthcare plan in lieu of a raise. Wages alone are not the correct measure of taxable income, however. Many wealthy individuals have investment and partnership income in addition to wages. And wages or salary may not be the only way individuals are compensated for their labor. They may receive stock options and bonuses as well.

Tax return data includes almost complete information about an individual's income received in a year. However, de-identified tax return data necessarily excludes information

¹This thesis owes its inspiration and empirical strategy to "What Happens When you Tax The Rich? Evidence from Executive Compensation," by Goolsbee (2000c). The paper is discussed in detail in later sections.

about the individual's employer. This exclusion creates two problems: individual income is unmoored from company performance, and tax returns report realized income in a year but do not measure any form of potential income. Here, I use "potential" to mean the income an individual would receive if he exercised all of his or her vested options grants. Individuals have discretion in the timing of these types of compensation, so they could time their exercise in anticipation of a change in tax rates. The fraction exercised in a given year gives a clearer picture of timing than absolute levels, and tax returns only report the level.

Goolsbee (2000c) uses executive compensation data in place of tax returns. Executive compensation totals accurately measure taxable income for individuals when their primary income is the compensation from working and when they do not have large outside investment portfolios. Goolsbee uses the Omnibus Budget Reconciliation Act of 1993 to estimate an elasticity of taxable income for the wealthy. Since 2000, researchers have revised estimates for this period but have not estimated the elasticity of taxable income for executives in later years. This paper uses executive compensation data to revise an estimate of elasticity of taxable income using data since 1992.

I theorize that executives will shift taxable income as much as possible in anticipation of a change in rates. That means taxable income should spike in the year preceding an increase in the top marginal tax rate. Because executives primarily have discretion over the timing of one form of taxable income, options-based compensation, a spike in taxable income should be driven by an increase in the value of options exercised in that year.²

I use two empirical strategies to estimate the elasticity of taxable income and the elasticity of the ratio of exercised options to total vested options for executives with incomes above the top marginal tax rate threshold. I find that taxable income increases slightly in years preceding tax increases.

Section 1 offers a summary of relevant statutory changes to the tax code since 1992. Section 2 reviews existing elasticity of taxable income literature and literature on execu-

²Executives would need to convince their Board of Directors to shift the timing of their salary and bonus to another period.

tive compensation. Section 3 describes the data used and Section 4 presents methodology. Sections 5 and 6 describe and discuss results. Section 7 concludes.

1 Tax Changes from 1986 to 2015

I exploit variation of the top marginal tax rate for ordinary income to measure executives' responsiveness. Below, I discuss those changes, beginning with the Tax Reform Act of 1986. While the 1986 changes are outside the scope of the sample I use, I include a description because of the 1986 Act's importance in existing literature. I used laws passed in 1993, 2001, 2003 and 2012 as policy changes of interest.

Congress passed the Tax Reform Act of 1986 (TRA86), which lowered the top marginal income tax rate by almost half, from 50% to 28%. The act also consolidated brackets. TRA86 was designed to be revenue neutral, so the Act generally increased revenue from corporations by eliminating exemptions and deductions and decreased revenue from individuals by lowering rates. In response to these changes, S-corporation income grew substantially (Saez, Slemrod, and Giertz 2012). In most existing literature, TRA86 is the earliest change exploited as a natural experiment, because of the data available and the scale of the change. The Omnibus Budget Reconciliation Act of 1990 (OBRA90) raised the top rate slightly, from 28% to 31%. In both cases, the tax acts apply to years not contained in the Execucomp.

The Omnibus Budget Reconciliation Act of 1993 (OBRA93) created two new income tax brackets above the top threshold established in 1991. A 36% rate applied to income above \$115,000 and a 39.6% rate applied to income above \$250,000. OBRA93 also included a provision to limit the deductibility of executive compensation. This provision, Section 162(m) in the U.S. Revenue Code, placed a \$1 million deductibility cap on the compensation of the CEO and the four other most highly paid executive officers, as disclosed in the proxy statement, for a public company. The rule change was first proposed during President Clinton's campaign, and was passed as part of OBRA93. Exempt from the deductibility cap is com-

compensation that is considered performance based, and is based on one or more pre-determined goals. The US Congress considers stock options performance-based compensation per se. Because OBRA93 moved rates in the opposite direction of TRA86, substantial literature exists exploiting its changes as well.

Following through on campaign promises, President Bush cut taxes twice, in the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) and the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA), collectively known as the “Bush Tax Cuts.” EGTRRA lowered the top tax bracket from 39.6% to 38.6% by 2002, keeping the income threshold for the top bracket the same. The reductions were designed to be slowly phased in, but the pace of the phase-in was accelerated in JGTRRA. JGTRRA cut rates from 38.6% in 2002 to 35% in 2003, and raised the income bracket threshold for the top rate by slightly less than \$5,000 for households. The rate decrease for the top bracket sunset in 2010.³

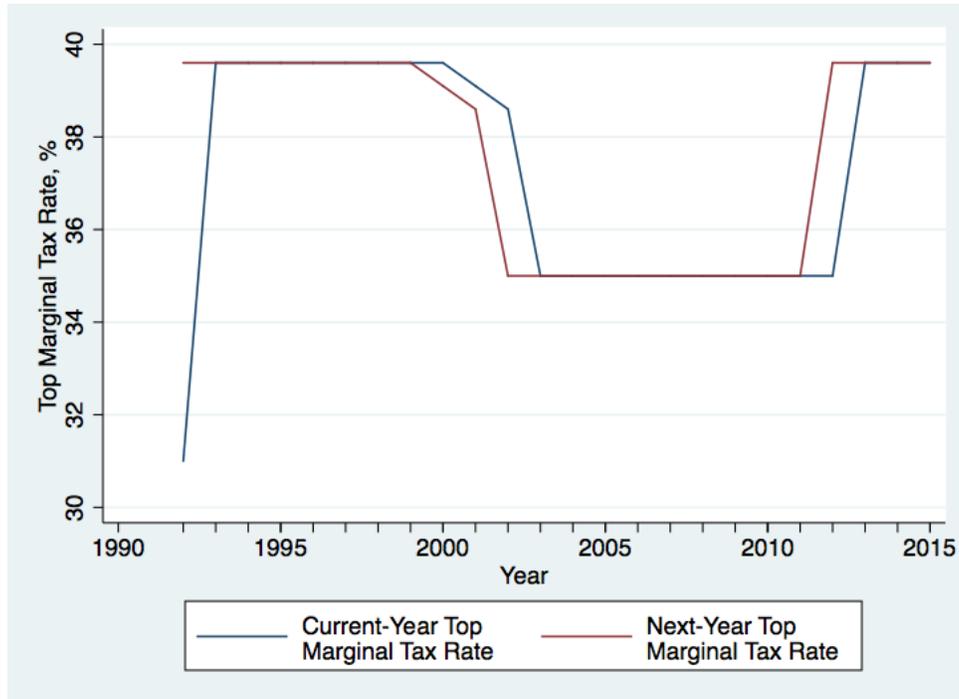
After the financial crisis and accompanying stimulus packages, Congress passed the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (the 2010 Tax Relief Act). The 2010 Tax Relief Act is notable for the changes it did not make to top marginal tax rates: as part of a compromise to ensure its passage, the Act left the Bush tax cuts in place.

Most recently, the American Taxpayer Relief Act of 2012 effectively added a new bracket, which brought the top rate back to the rate set in OBRA93. The Act did so by letting the Bush tax cuts, extended in the 2010 Tax Relief Act, expire for certain taxpayers. This set a top marginal income tax rate of 39.6% for taxable income over \$400,000 for individuals and over \$450,000 for married couples filing jointly. The dividends and capital gains tax rates changed as well. A highly-publicized Medicare surtax of 3.8%, a provision of the Patient Protection and Affordable Care Act that took effect in 2013, applies only to investment

³The expiration of the “Bush Tax Cuts” were included so the bill was scored as revenue neutral. This allowed Congress to pass the bill using Congressional reconciliation measures without violating the Byrd Amendment, an amendment that requires a bill passed by reconciliation measures to be revenue neutral.

income and not to ordinary income. Thus, the Taxpayer Relief Act is the most recent statutory change to the top marginal ordinary income tax rate.

Figure 1: Top Marginal Tax Rates, 1992-2015



Wealthy individuals might behave in election years as they would in years with legislative change. In 1992 and 2008, executives anticipating a loss for the Republican incumbent may have timed their exercise in that year to take advantage of a lower rate. That is, if they expected income tax rates to rise in Democratic administrations, executives would realize ordinary income in the current period if possible. In reverse, executives in 2000 and 2012 may have delayed the exercise of their options in anticipation of lower rates if a Democratic incumbent lost. In general, a year with the possibility of a change in the political party in power may have the same effect as a statutory change in a year, whether or not the rates actually change. This behavior is only likely to occur if an executive can exercise their options all at once, after a November election. I assume that executives have perfect knowledge of the rate in the next year, so I exclude election years from my years of interest unless those years have a statutory change following them.

Another change to the top marginal tax rate may occur as a consequence of the new presidential administration. President Trump proposed a tax reform plan on April 26, 2017 that lowers the top marginal tax rate. Understanding the response to the Bush tax cuts improves estimates of the effects of President Trump’s proposed plan.

2 Existing Literature

2.1 Measuring the Elasticity of Taxable Income

Executives’ timing of options is part of literature that extends the response of an individual to changes in the marginal tax rate beyond the individual’s trade-off of labor and leisure. New tax responsiveness literature broadened discussion beyond the “Laffer Curve” to consider other strategies individuals may use to minimize tax burdens. This literature argues that policymakers should focus on taxable income, not hours worked, when estimating revenue gains and deadweight losses. Generally, this literature uses changes in tax law in the 1980s and early 1990s as instruments to estimate elasticities of taxable income. These studies use panel data from individual tax returns.

Beginning with tax return data from 1951, Feenberg and Poterba (1993) observe what proportion of adjusted gross income is from very high income tax returns. The increase in adjusted gross income through 1990 comes from an increasingly smaller share: one quarter of one percent of taxpayers, and the share from this fraction of taxpayers increases sharply after the Tax Reform Act of 1986. Feenberg and Poterba argue the increase is due to a reduced incentive for households to engage in tax avoidance because of lower rates. Slemrod (1995) corroborates their findings, suggesting that a response to changing tax rates drove the increase in reported adjusted gross income in 1987.

Feldstein (1995) seeks to measure the elasticity of the response that Slemrod and others document, using panel data that includes variation in rates from the Tax Reform Act of 1986. The Tax Reform Act of 1986 cut tax rates for earners such that a household kept 44

percent more of a marginal dollar. Using a difference-in-difference approach with panel data, Feldstein finds an elasticity of 3.05. He argues that this result means the 1993 increase in tax rates would generate little additional revenue because taxable income would fall sharply. However, Feldstein's result is limited by the small number of high-income people in his sample. Auten and Carroll (1995, 1997) find a significant, but smaller, elasticity in their work with a larger sample for the same period.

Rising inequality, concurrent with tax rate cuts for groups whose incomes were rising fastest, confounds estimates of elasticity that use variation from the Tax Reform Act of 1986. For instance, Slemrod (1996) suggests the increase in adjusted gross income before 1986 is entirely attributable to rising inequality. The lowering of rates for top earners would create an upwards bias in the estimates of elasticity. Two lesser problems in the literature to this point, caused by using individual tax returns, are a small sample of the extremely wealthy and a lack of firm-level detail for executives whose wealth depends on corporate performance (Goolsbee 2000b).

2.2 Estimates Using Executive Compensation

Goolsbee (2000c) uses different income data in place of tax returns and exploits a rate increase to avoid upwards bias. He constructs a panel of executives at publicly traded companies that were included on the Standard & Poor's 500, Mid-Cap 400 and Small-Cap 600 indexes between 1992 and 1995. Publicly traded companies are required to disclose the compensation of their CEO, CFO, and three other most highly-compensated executives. 75% of the executives in Goolsbee's sample have annual taxable income above the top marginal tax rate threshold, allowing Goolsbee to study the behavior of high income individuals.

This paper defines two independent variables, the current net of tax share and the future net of tax share, to identify the responsiveness of executives. Given τ_t , the current top marginal tax rate, and τ_{t+1} , the future top marginal tax rate, $1 - \tau_t$ and $1 - \tau_{t+1}$ are the share of income a household would retain at the top and new rate. The shares approach the

average net of tax share for very high income households, whose average tax rate approaches the top marginal tax rate.

Results from Goolsbee indicate a large, temporary shift in the timing of the exercise of options around OBRA93. The short-run elasticity ranges from 1 to 1.43, but long-run elasticity of executives taxable income is between 0.07 and 0.4, depending on the specification. Short run elasticity is much higher for executives with taxable income over \$1,000,000 but long run results are the same. If the results of Goolsbee (2000c) hold, they contradict Feldstein's hypothesis that OBRA93 would not generate additional revenue from the increase in top rates.

Hall and Liebman (2000) use a panel of executives from a different source to estimate the elasticity of taxable income over the same period as Goolsbee (2000). They argue that the apparent tax shifting in 1993 is attributed to stock market performance and timing of past option grants. The panel data of Hall and Liebman includes compensation before the Execucomp data becomes available, and Hall and Liebman find no similar response to tax changes in 1981 or 1986. They say elasticities in Goolsbee (2000c) may be accurate, however, the elasticities are not responses to tax rate changes, rather, to stock market performance.

2.3 Issues with Empirical Estimations of the Elasticity of Taxable Income

Saez, Slemrod and Giertz (2012) summarize key issues in empirical estimations of elasticity using OBRA93 as an example. Many methods rely on the faulty assumption that a change in income share for a given tax bracket is unrelated to a change in the marginal tax rate. As Slemrod and others note above, this is unlikely. One possible solution to this bias, adding a time trend, introduces its own problems. Too many time controls necessarily destroy the usefulness of the time series identification. A difference-in-difference method, one of several used by Goolsbee (2000c) offers different identification problems in that the control and treatment groups are both defined by income.

Saez, Slemrod and Giertz also review existing literature on the elasticity of taxable income. In summary, researchers have found that the highest estimates of elasticity are short-run estimates for the top one percent of earners; long-run estimates and estimates for other income groups are substantially lower. All face some empirical biases; rising income inequality proves to be one of the most challenging factors to control for.

2.4 Literature Executive Compensation

Literature on executive compensation seeks to explain the growth in the level of total compensation as well as trends towards performance based pay. Murphy (2012) reviews the increased use of stock options, which drove the tripling of compensation at S&P 500 firms between 1992 and 2001. He ascribes six main factors to the growth: shareholder pressure for equity-based pay, SEC holding-period rules, the \$1 million deductibility cap introduced in 1994, accounting rules for options, SEC options disclosure rules, and NYSE listing requirements.

The \$1 million deductibility cap changed the rules for the deductibility of employee compensation, unless the compensation was strictly performance based. The 1992 change was first proposed during President Clinton's campaign, and was passed in 1993 to apply to the CEO, CFO and three next most highly paid executive officers as disclosed in the proxy statement. The performance rule encouraged companies to issue options as compensation on top of, rather than in lieu of, salary. Rose and Wolfram (2003) find the deductibility cap had little effect on the overall composition of compensation, but might have led to some bunching of salary at the \$1 million level.

Kaplan (2013) echoes findings of Murphy (2012), that since the large increase in compensation for S&P 500 executives in the 1990s, compensation has leveled off close to 1998 values. Compensation for CEOs at firms outside the S&P 500 has not kept pace with compensation at the largest firms. Moreover, less work exists on pay patterns for non-CEO executives.

To discuss whether CEOs are paid for performance, Murphy (2012) and Kaplan (2013)

distinguish between estimated and realized pay. CEO wealth is strongly tied to firm performance, especially since the 1980s (Frydman and Saks 2011, Murphy 2012, Kaplan 2013). The firms of CEOs in the top quintile of pay are in the top quintile of performance, and the reverse is true for the lowest-paid CEOs. Kaplan (2013) says it is harder to determine whether the pay for performance is optimally or efficiently structured. However, the value of options is clearly dependent on the performance of the company.

3 What Does Executive Compensation Data Include?

Most literature uses samples of tax returns. Individuals' tax returns provide information on the multiple types of income an individual receives, both in salary and from investments. A random sample of tax returns would contain only a small number of very wealthy individuals, since fewer than 5% of Americans face the top marginal tax rate.

One challenge of tax return data, even if the wealthy are oversampled, is that the returns are stripped of information that identifies individuals. This means researchers are unable to incorporate information about a firm's performance that would influence an individual's decision to exercise options or realize capital gains. While a firm's performance is correlated to the overall performance of the economy, insofar as an individual has control over the timing of his compensation, he or she will time it with respect to the firm's performance, not to the market's performance. Thus, ideal data would combine tax returns with other identifying information such that a full picture of an individual's wealth and firm performance can be used to measure elasticity.

SEC reporting requires firms to disclose the compensation of the CEO, CFO, and the three next-most highly paid employees at a firm. I am able to use data from proxy statements of publicly traded companies available on Execucomp. Execucomp reports information from Item 11 in Part 3 of public companies' annual filings, which require reporting the total compensation of the five most-highly paid executives in a publicly traded company, in addition

to the executive's disaggregated salary, options awards, non-equity incentive plan compensation, and several other types of compensation. I use compensation data as the measure of taxable income for executives.

For some executives, the compensation reported on proxy statements is not fully representative of their annual income. Income from other investments, like investment portfolios with assets other than company stock, would not be reported on the proxy statement. However, Slemrod (1995) finds almost a third of the households in the top 1% of the income distribution have 90% of their income comprised of wages and salaries. The approximately 20% of the distribution with no wage income reported at all likely is not a part of the population of executives. Thus, while compensation data will underreport an individual's total wealth, it captures the portion of an executive's income subject to ordinary income tax rates. Furthermore, the compensation data provides information about the size of potential realizations, by listing the stock of vested options. A separate method would be needed to evaluate the responsiveness of individuals to changes in the capital gains tax.

3.1 The Sample of Firms

I have twenty-three years of data on executives, from 1992 to 2015, on Execucomp. The universe of firms in Execucomp is: all firms in the S&P 500, Mid-Cap 400, and Small-Cap 600 as of 1992, and any firm added to one of these three indexes. Once a firm is in Execucomp, its information is updated, even if the firm is removed from the index. Unfortunately, historical data for firms who were not members of the S&P 1500 in 1992 but are today is not available. Data collection only begins when the firm joins the S&P 1500. More observations are available in later years. The firm's historical index membership is also unknown, so I choose not to limit the sample by index at all. In order to match the calendar year for tax purposes to a company's fiscal year, I limit the companies to only those with fiscal years ending in December.⁴

⁴32.5% of firms have fiscal years ending between January and November. Notable firms include Microsoft, with a June fiscal year-end, and Apple, with a September fiscal year-end. The remaining 2,600 firms have

After limiting the data in this way, there are 2,500 unique companies and 35,000 unique executives with 181,000 observations. Only 7% of the 35,000 executives are women. Based on the gender composition of the sample, I make an assumption that all executives in this sample are married filing jointly, and that this compensation represents the total household income. This allows me to use the bracket thresholds for married couples.

An executive has no data if they are not CEO, CFO or among the three other most highly paid executives in a given year, or if they leave the company. Very few executives (less than 1%) appear in the data for all 23 years. 40% of executives appear fewer than four times. The attrition could bias the results if the executive departs for poor performance reasons. The departing executive likely has a small amount of compensation to exercise, which means the executives remaining have a higher probability of exercising options.

Forty percent of firms in the dataset are in one of five industries: extractive industries, healthcare, industrials, technology, and financial services.⁵ The average market capitalization of a firm in the dataset has grown from \$2.9 billion in 1992 to \$12.2 billion in 2015. The maximum market cap, from 2007, belongs to Exxon Mobil, and is more than \$500 billion. In Table 1 I present the number of firms, the average market cap, and the average return on assets for each year.

3.2 The Sample of Executives

Executive compensation data decomposes total taxable income into its component parts. This allows us to see if variation from year to year is type specific, and if so, in what type the variation occurs. I define total taxable income to be the sum of salary, bonus, options exercised in the year, and Non-Equity Incentive Plan Compensation.⁶ The variation in

December year-ends.

⁵Compensation packages vary widely between these five industries. While total mean compensation values are roughly equal across the five industries, the use of options varies widely. For executives with options, technology and healthcare firms have mean values of options exercised that are \$400,000 to \$500,000 higher than industrials or natural resources.

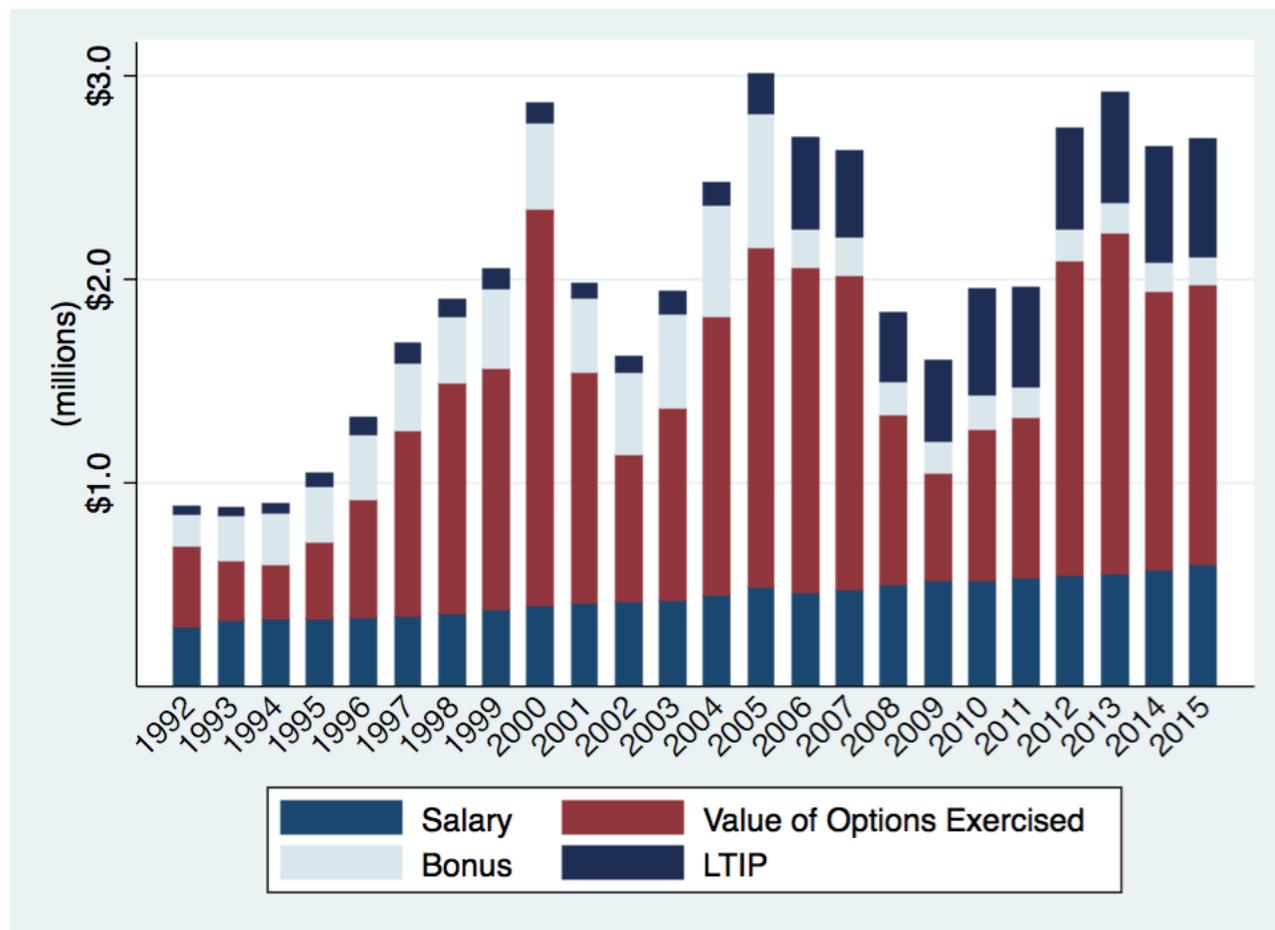
⁶I exclude Restricted Stock Units (RSUs) because only the initial grant is taxed as ordinary income when it vests. Any proceeds or losses on the sale of stock after the vesting period ends are taxed as capital gains.

Table 1: Firm-Level Mean Values, 1992-2015

	1-yr. TSR (%)	Market Value (millions)	Return on Assets (%)	Firm Assets (millions)
1992	23.19	2,925	3.443	7,373
1993	22.21	3,131	3.357	7,926
1994	-1.17	2,984	3.613	8,284
1995	35.91	3,843	3.158	8,543
1996	24.22	4,365	2.901	8,823
1997	31.88	5,585	2.549	9,433
1998	11.8	6,615	1.739	10,515
1999	19.93	7,851	2.73	12,370
2000	21.83	8,529	3.123	14,204
2001	10.37	7,489	-2.297	14,751
2002	-11.07	5,862	0.736	15,060
2003	48.59	7,319	2.153	16,305
2004	22	8,129	2.231	17,853
2005	11.36	8,905	3.1	19,623
2006	19.26	8,963	4.564	18,895
2007	4.206	8,500	3.798	18,926
2008	-33.66	5,395	0.213	16,769
2009	41.57	6,783	1.877	19,516
2010	27.99	7,554	4.117	23,203
2011	-2.601	7,632	4.238	23,269
2012	19.96	8,653	3.361	25,831
2013	43.42	11,429	3.756	23,415
2014	9.162	12,349	3.482	28,257
2015	-3.834	12,208	1.603	29,429

compensation levels is shown in Figure 2. As expected, most of the variation is in the value of options exercised.

Figure 2: Mean Executive Compensation by Type, 1992-2015



The mean value of taxable income rose from \$951,000 in 1992 to \$2.82 million in 2015. Salary grew from a mean \$285,000 in 1992 to \$584,000 in 2015. Meanwhile, compensation in the form of options has grown substantially more, from \$397,000 to \$1.4 million. In CPI-adjusted 1992 dollars, salary has grown by less than \$50,000. The value of options exercised has increased by more than \$300,000. Mean values of compensation types are shown in Table 2 by year. Less than one fifth of executives in the sample have taxable income below the threshold for the top marginal tax rate, so I exclude the small number of executives with

Therefore, the only discretion an executive has on the timing of RSUs is for income taxed as a capital gain. Moreover, it is challenging to distinguish between the ordinary income original grant and taxable gains or losses in Execucomp data.

total taxable income below that threshold.⁷

Table 2: Mean Executive Compensation, Total and by Type, 1992-2015

	Taxable Income	Salary	Value of Options	Bonus	Long Term Incentive Plan	Other Annual	Number of Options Awarded
1992	951.1	285.7	397.6	160.2	54.11	18.56	29.95
1993	978.6	319.9	295.1	224.2	51.58	23.55	37.99
1994	998.1	324.9	270.7	254.1	54.83	21.15	39.36
1995	1,166	328.7	374.5	275.7	80.59	21.34	48.88
1996	1,457	335.7	578.4	320.1	103.1	23.38	60.2
1997	1,818	341.4	910.7	335	113.1	23.78	84.62
1998	2,030	354.8	1,134	327.1	98.94	26.52	98.2
1999	2,186	372.1	1,185	392.5	116.9	29.07	110.9
2000	2,998	390.2	1,949	426	121.7	30.22	125.4
2001	2,109	406.4	1,134	364.4	85.24	34.49	136
2002	1,767	413	721.9	407.5	94.4	34.78	111.4
2003	2,088	421.9	945.1	459.1	130.5	39.84	85.58
2004	2,579	443.8	1,369	547.9	133.7	43.08	79.88
2005	3,058	484.8	1,666	663.5	243.9	51.65	111.1
2006	2,860	455.6	1,599	189.5	457.3	189.1	63.17
2007	2,737	471.7	1,544	186.6	489.1		64.8
2008	1,935	498.6	830.8	165.6	403.1		78.84
2009	1,709	517.1	526.4	154.6	478.2		81.99
2010	2,076	517.1	744	169.3	607.8		63.73
2011	2,091	531	787.4	147	584.4		57.95
2012	2,874	540	1,548	155.9	586.2		45.2
2013	3,054	552.6	1,675	147.8	639.7		52.95
2014	2,790	569.9	1,369	141.4	683		49.28
2015	2,816	594.2	1,374	139	708.6		42.81

The 23-year sample allows me to exploit several instances of variation in the top marginal tax rate, and to measure the response with several different variables. I use the traditional measure of taxable income described above. This is the measure of the income in a compensation package subject to the ordinary income tax rate. I also contribute a second variable, which takes advantage of Execucomp's unique reporting of options data. Because SEC filings include vested unexercised options, I can measure what share of his or her grant an executive exercises in a given year. This allows me to compare realized compensation to

⁷Goolsbee (2000c) uses executives with income below the top threshold as part of a difference-in-differences approach to study the responsiveness of executives. He finds executives with income less than the top threshold (equal to approximately \$250,000 in 1992) have elasticities very close to zero.

possible compensation. Executive compensation data offers this insight.

I define the ratio of options exercised to options vested as:

$$ratio = \frac{\text{options exercised}}{\text{options exercised} + \text{unexercised vested options}} \quad (1)$$

The mean value of the ratio in the sample is 0.19. The purpose of the ratio dependent variable is to remove firm size as a confounding variable in the executives response. An executive exercising a large fraction of a small grant is timing his options to a greater extent than an executive exercising a large dollar value of his options but a small fraction of his total grant. Practically speaking, using taxable income as the dependent variable avoids zeros in years, and thus, dropping observations. For the same reasons, I take the natural logarithm of the ratio of options plus 1, instead of the natural logarithm of the ratio in the specification.

4 Two Methods for Estimating Responsiveness

I use two different approaches to measure the responsiveness of an executive to changes in the tax rate. The first is a regression for the entire period with year dummy variables in the years immediately preceding a change in the top rate. The second is taken from Goolsbee (2000c), where I vary the period. For both methods, I test the log of taxable income and the log of the ratio of options exercised to options vested.

4.1 Method 1: Year Dummies

My first approach is to regress taxable income and the ratio of options exercised to options vested with standard control variables, individual fixed effects, and dummy variables for the four years that immediately precede a change in the top tax rate. The specification, for taxable income, is as follows:

$$\begin{aligned} \ln(\text{taxable income}) = & \beta_0 + \beta_1 Year_{1992} + \beta_2 Year_{2001} + \beta_3 Year_{2002} + \beta_4 Year_{2012} \quad (2) \\ & + \beta_5 mkt.val + \beta_6 ROA + \beta_7 Year + \varepsilon \end{aligned}$$

where $Year_{1992}$, $Year_{2001}$, $Year_{2002}$, and $Year_{2012}$ are dummy variables for their respective year i .

Other year effects, including stock market performance, will also have an effect on the magnitude of the year coefficient. However, I include controls for the firm's return on assets, market cap, and a linear time trend to account for some of this effect. I use individual-level fixed effects.

The coefficient on a given year is, in the case of taxable income, the percent above the expected value of taxable income expected in an average year. For the ratio specification, the coefficient is the percent increase in the ratio relative to the expected ratio. I expect the signs of the coefficients on the indicator variables for the years 1992 and 2012 to be positive. This would imply that in the years 1992 and 2012, executives had more taxable income than the average in other years. The largest positive coefficient should be on the dummy variable for 1992. This is consistent with the hypothesis that executives behave rationally and time their options to face the lowest possible tax rate. The signs on the coefficients for the years 2001 and 2002 should be negative, consistent with the hypothesis that executives are deferring compensation until a later period to take advantage of a lower rate.

4.2 Method 2: Net of Tax Share

My second approach is to use the log-log specification from Goolsbee (2000c) for the 23-year period and for selected periods since 1997.⁸ The specification for taxable income is as follows:

⁸I do not recreate results from 1991 to 1997 because Execucomp is missing compensation data in years before 1992. Because data is missing before 1992, it is not possible to exploit variation from OBRA93 in the net-of-tax-share method, since future net-of-tax-share does not change between 1992 and 1998.

$$\begin{aligned} \ln(\text{taxable income}) = & \beta_0 + \beta_1 \ln(1 - \tau_t) + \beta_2 \ln(1 - \tau_{t+1}) \\ & + \beta_3 \text{mkt.val} + \beta_4 \text{ROA} + \beta_5 \text{Year} + \varepsilon \end{aligned} \quad (3)$$

The terms τ_t and τ_{t+1} are the top marginal income tax rate in the current year and in the next year, respectively. Thus, $1 - \tau_t$ is the share of income a household currently retains on every marginal dollar above the top rate threshold, and $1 - \tau_{t+1}$ is the share of income a household would retain at the new rate. It approaches the average net of tax share for very high income households, whose average tax rate approaches the top marginal tax rate. I include individual fixed effects to account for individuals heterogeneity of preferences across different firms. I also include standard controls that are in previous work: market value, the return on assets, and a linear time trend.⁹

I expect that the elasticity of taxable income with respect to the current tax share is positive and at least 1. The estimated elasticity of taxable income with respect to the future net of tax share should be smaller than 1 and negative. This would give a non-transitory elasticity close to zero, like the estimates in Goolsbee (2000c) suggest. The direction of each coefficient should be the same when the dependent variable used is the ratio of options exercised to vested options. The coefficients given the ratio of options exercised to vested options are likely to be smaller than those given taxable income, because the ratio is, by definition, bound between 0 and 1.

In addition to finding the elasticity for all executives, I limit the sample to only CEOs to measure whether their responsiveness differs from the executive population as a whole. 5,200 executives in the data are CEOs. CEOs have much larger options grants, on average, than other executives.¹⁰ However, the timing discretion of CEOs may be constrained by

⁹Hall and Liebman (2000) include the lagged annual S&P return, the firm's lagged annual stock return, and the high corporate tax rate in their control variables. In future research, I suggest using stock price appreciation in place of return on assets as a control variable.

¹⁰Executives' mean value of options exercised is \$1,000,000 larger than the mean value of options exercised

their public-facing role a CEO exercising a large portion of his or her options grant may be perceived as a signal of a lack of confidence in the company. While CEOs face unique timing constraints, I still expect that the magnitude of the elasticity is larger for CEOs only than for the general population, given the much higher value of options grants for CEOs.

I run the specification that includes current and future tax share for the entire 23-year period of data as well as for two smaller periods of approximately seven years. The shorter period addresses the problem of relatively little variation in the full sample. I use two periods, 1998 to 2006 and 2007 to 2015, as the shorter periods. The period from 2007 to 2015, roughly corresponding to President Obama's administration, has variation most similar to Goolsbee (2000c).

5 Results

I present results for the year dummy variables and for the regression with net of tax share. For the entire sample, the estimated coefficients are about one half of the value I expect. However, in the second method, I limit the sample to only CEOs. With this subsample, I find elasticity of taxable income with respect to the current net of tax share above 1.

5.1 Results with Method 1, Year Dummies

The results begin in Table 3 with a simple regression on four year dummies for the years immediately preceding a change in the top marginal tax rate. This method is described in more detail in Section 4.

As hoped for, the signs on 1992 and 2012 are positive. The magnitude of the coefficient for the 1992 dummy variable on taxable income is 0.0407, shown in Column (1); this means that in the year 1992, taxable income was 4% higher than expected. In dollar values, this suggests that if total compensation for an executive was \$2,000,000 in a year, it was \$78,216

for the population of executives in the full sample.

Table 3: Taxable Income and the Ratio of Options Exercised on Year Dummies, 1992-2015

	(1)	(2)
	Taxable Income	$\frac{\text{options exercised}}{\text{vested options}}$
Year 1992	0.0407*** (0.0116)	0.0417*** (0.0036)
Year 2001	-0.0562*** (0.0097)	-0.00722** (0.0030)
Year 2002	0.00394 (0.00958)	0.00658** (0.00297)
Year 2012	0.0385*** (0.0086)	0.0174*** (0.0027)
	0.455*** (0.00384)	0.0491*** (0.00119)
ROA	0.00192*** (0.000157)	0.000361*** (0.000049)
Year	0.0587*** (0.000697)	0.00432*** (0.000216)
Constant	-114.2*** (1.385)	-8.894*** (0.430)
Observations	150,541	150,945
R-squared	0.253	0.032
Number of execs.	33,592	33,658

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

higher than expected. The magnitude of the coefficient is the same if the ratio of options exercised is specified as the dependent variable, as in Column (2); the ratio was 4% higher than expected in 1992. In dollar values, this translates to a value of options exercised that was about \$7,600 dollars higher than expected for an executive with \$1,000,000 in vested options. The magnitude of the change in 2012 is 0.0385 in the specification for taxable income (1) and 0.0174 in the case of the ratio of options exercised to options vested (2). In dollar values, this means taxable income for an executive with \$2,000,000 in taxable income was \$74,000 higher than expected and the value of options realized for an executive who had \$1,000,000 vested in 2012 was \$3,200 higher than expected.

Multiple cuts to the tax rate by President Bush were made during a period of three years, which is reflected in the contradictory signs and lack of statistical significance on the dummy variables for the years 2001 and 2002. However, in both specifications, the year 2001 has a statistically significant negative coefficient, consistent with the hypothesis that an executive would defer the exercise of taxable income to a later year if possible. An executive with \$2,000,000 in taxable income would have realized \$119,000 less than expected. Estimates from this period are confounded by the aftereffects of the dot-com bubble, where many executives' options would have been out of the money.

5.2 Net of Tax Share Results, 1992-2015

My second approach is to regress the variables of interest on the current and future net of tax share. Results for the 23 years included in the sample are presented below. The results begin with Column (1) of Table 4, the regression of the current and future income tax shares on ordinary taxable income, for the entire period. Column (2) presents the same specification for CEOs only.

The elasticity of taxable income with respect to the current net of tax share is 0.411 for the full sample of executives. That is, given a 1% increase in the kept share of taxable income, taxable income should increase 0.411%. For an executive with \$2,000,000 in taxable

Table 4: Taxable Income and the Ratio of Options Exercised on Net of Tax Share, 1992-2015

	(1)	(2)	(3)	(4)
	Taxable Income	Taxable Income	$\frac{\text{options exercised}}{\text{vested options}}$	$\frac{\text{options exercised}}{\text{vested options}}$
		(CEOs Only)		(CEOs Only)
$\ln(1 - \tau_t)$	0.411*** (0.0622)	0.861*** (0.186)	0.203*** (0.0224)	0.371*** (0.0555)
$\ln(1 - \tau_{t+1})$	0.818*** (0.0775)	0.363* (0.202)	-0.158*** (0.0279)	-0.285*** (0.0601)
$\ln(mkt.val)$	0.463*** (0.00391)	0.539*** (0.00899)	0.0434*** (0.00141)	0.0311*** (0.00268)
ROA	0.00355*** (0.000199)	0.00204*** (0.000365)	0.000616*** (7.18E-05)	0.000349*** (0.000109)
Year	0.0592*** (0.000668)	0.0476*** (0.00157)	0.00404*** (0.000241)	0.00464*** (0.000469)
Constant	-114.7*** (1.326)	-91.36*** (3.127)	-8.272*** (0.478)	-9.376*** (0.932)
Observations	127,311	26,333	127,318	26,334
R-squared	0.307	0.275	0.025	0.023
Number of execs.	29,610	5,052	29,613	5,053

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

compensation, a 4.6 percentage point decrease in the top tax rate would correspond to an increase of taxable income of \$62,600. This elasticity is roughly half of the estimate in Goolsbee (2000c) but has the same direction. It is one-sixth of the maximum elasticity estimated by Feldstein. The elasticity of taxable income with respect to the current tax share for CEOs only is about twice as large, and equals 0.861. This is likely a feature of the significantly larger options grants CEOs have relative to other executives.

Unlike the results of Goolsbee (2000c), the coefficient on the future net of tax income share is positive in this regression. The elasticity of taxable income with respect to the future net of tax income share is estimated as 0.818. This would imply for a 1% increase in the future kept share of taxable income, taxable income in the present year should increase 0.818%. This is a counterintuitive result, because it suggests that if rates were to fall in the next year, an executive would exercise more compensation in the current period at a higher rate. The coefficients for CEOs only are similar in direction and magnitude. Two problems may confound the estimation. First, there is little variation in the future tax rate exists in the sample. Because rates changed in 1993, and data begins in 1992, the future rate changes only three times while the current rate changes four times. Second, compensation overall has grown substantially since 1992. Despite controls for market value, the overall growth in income over 23 years might confound results. This is a problem in other literature.

Column (3) presents the regression of the current and future income tax shares on the ratio of exercised to total options. The elasticity of 0.203 translates to a 0.203% increase in the ratio of exercised to total options for every 1% increase in the current net of tax income share. For a 4.6 percentage point decrease in the top tax rate, the value of options exercised for an executive with \$1,000,000 in vested options would be \$15,460 higher. The coefficient is higher for CEOs only, and equals 0.371, reflecting their larger stock of options.

In this regression, the coefficient with respect to the future net of income tax share is negative and of the correct magnitude relative to the coefficient on the current tax share. The future net of income tax share is -0.158 for the full executive population. So, if the future

net of tax share rises (that is, the tax rate is lower in the next year than in the current year) the ratio of options exercised to vested will be lower than expected in the current year. This is consistent with my hypothesis, and implies that executives are shifting options depending on the tax rate. The sum of the two coefficients is the non-transitory elasticity, and it is close to zero.

5.2.1 Net of Tax Share Results, 2007-2015

In Table 5, I limit the years in the sample to 2007 through 2015. This exploits the largest change in rates available with complete data in the sample, and estimating elasticity for a smaller period also addresses the likely problem with the results for the 23-year period, which is a lack of variation. Indeed, the direction of the coefficient on the future net of tax share for the full sample of executives between 2007 and 2015 is correct here, as shown in Column (1).

Table 5: Taxable Income and the Ratio of Options Exercised on Net of Tax Share, 2007-2015

	(1)	(2)	(3)	(4)
	Taxable Income	Taxable Income (CEOs Only)	$\frac{\text{options exercised}}{\text{vested options}}$	$\frac{\text{options exercised}}{\text{vested options}}$ (CEOs Only)
$\ln(1 - \tau_t)$	0.558*** (0.130)	1.370*** (0.311)	0.179*** (0.053)	0.421*** (0.103)
$\ln(1 - \tau_{t+1})$	-0.860*** (0.1350)	-1.038*** (0.3260)	-0.443*** (0.0548)	-0.452*** (0.1080)
$\ln(mkt.val)$	0.382*** (0.00677)	0.459*** (0.01570)	0.0465*** (0.00274)	0.0295*** (0.00522)
ROA	0.00380*** (0.000321)	0.00471*** (0.000749)	0.000598*** (0.000130)	0.000560** (0.000248)
Year	0.0447*** (0.00225)	0.0439*** (0.00525)	0.00160* (0.00091)	0.00401** (0.00174)
Constant	-85.89*** (4.455)	-83.90*** (10.410)	-3.572** (1.803)	-8.183** (3.452)
Observations	54,892	11,711	54,892	11,711
R-squared	0.193	0.193	0.022	0.016
Number of execs.	14,869	2,600	14,869	2,600

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The elasticity of taxable income with respect to the current net of tax share is estimated at 0.6558, and the elasticity of taxable income with respect to the future net of tax share is -0.860. This elasticity with respect to the future tax share corresponds to \$130,000 less realized in the next year, for someone with compensation of \$2,000,000 and a 4.6 percentage point tax increase. The sum of elasticities is the non-transitory elasticity, which in this case, is less than zero, and not large. This means the change in taxable income is a short-run shift that will not permanently reduce the base of taxable income from executives. The elasticity with respect to the current net of tax share is about half of what I expected, and is half the size of Goolsbees estimate.

The elasticity of taxable income with respect to the current net of tax share for CEOs is twice the estimated elasticity for the full sample. Here, the elasticity is greater than one and is similar to the magnitude to Goolsbee (2000c). The elasticity of taxable income with respect to the future net of tax share is correspondingly larger as well, although not double the result for the full sample of executives; in this case, the sum of the non-transitory elasticities is 0.3.

Column (3) of Table 5 shows results for the alternative dependent variable, the ratio of options exercised to vested, for the same period. Again, the signs agree with the hypothesis that executives will shift options between years with a tax change. The elasticity of the ratio of options with respect to the current net of income tax share is 0.179, and the elasticity of options with respect to the future net of income tax share is -0.443. The magnitudes of the elasticities for options are smaller than the estimates of elasticity for taxable income, which is consistent with the estimates for the entire 23-year period. And, most interestingly, the non-transitory elasticity is equal to the non-transitory elasticity estimated for taxable income: approximately -0.3. This suggests a close relationship between taxable income and the ratio of options, which is expected because options are the primary type of compensation an executive can shift.

Similar to the pattern for coefficients for taxable income, the coefficient for the ratio

of exercised to vested options is twice the size for CEOs as it is for all executives. The result suggests that for a 1% change in the current net of tax share, the ratio of exercised to vested options should increase 0.421%. The coefficient for future net of tax share for CEOs is not significantly larger than the coefficient for all executives, meaning the non-transitory elasticity is zero.

5.2.2 Net of Tax Share Results, 1998-2006

Results during the period overlapping with President Bush's administration from 1998 to 2006, in Table 6, do not follow the pattern in 2007 to 2015 results. Columns (1) and (2) presents the results for taxable income.

Table 6: Taxable Income and the Ratio of Options Exercised on Net of Tax Share, 1998-2006

	(1)	(2)	(3)	(4)
	Taxable Income	Taxable Income (CEOs Only)	$\frac{\text{options exercised}}{\text{vested options}}$	$\frac{\text{options exercised}}{\text{vested options}}$ (CEOs Only)
$\ln(1 - \tau_t)$	-0.836*** (0.245)	-1.401** (0.577)	-0.713*** (0.0799)	-0.762*** (0.152)
$\ln(1 - \tau_{t+1})$	0.246 (0.231)	0.311 (0.540)	0.178** (0.0754)	0.182 (0.142)
$\ln(mkt.val)$	0.610*** (0.00950)	0.672*** (0.0210)	0.0659*** (0.00310)	0.0479*** (0.00554)
ROA	0.00195*** (0.000332)	0.000475 (0.000540)	0.000282*** (0.000108)	0.000125 (0.000142)
Year	0.0813*** (0.00423)	0.0849*** (0.00993)	0.0171*** (0.00138)	0.0156*** (0.00261)
Constant	-160.9*** (8.560)	-168.0*** (20.120)	-34.82*** (2.791)	-31.66*** (5.295)
Observations	40,524	8,470	40,531	8,471
R-squared	0.269	0.254	0.045	0.033
Number of execs.	13,381	2,414	13,384	2,415

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The coefficient on the current income tax share is negative, both for all executives and for CEOs. The elasticity of taxable income with respect to the net of tax share for the full sample of executives in this period suggests that for a 1% increase in the net of tax share,

taxable income should fall by 0.836%. This is surprising, because this behavior would be irrational. The coefficient on the future income tax share is not statistically significant.

These findings are probably not a refutation of Goolsbee or my results from the Obama period. This estimate of elasticity confounded by the unique economic conditions between 1999 and 2003. Specifically, options are the only form of compensation easily shifted from period to period. Options issued during the dot-com bubble were issued at extremely high prices, and in 2002 and 2003, millions of dollars of executives options would have been out of the money and essentially worthless.¹¹ So, even if it was tax advantageous to time exercise with the lowering of the ordinary income tax rate, executives had no options to time.

Again, the results in Column (3) and (4) are for the ratio of options exercised to total options. These fit the pattern of taxable income in the Bush period: the magnitude of the elasticity with respect to options exercised is smaller than the elasticity with respect to taxable income, but the sign is the same. One caveat to this result is that the coefficient on the future net of tax share is only statistically significant at the p(0.1) level. The corresponding coefficient in Column (1) is not statistically significant, so I am unable to compare their signs or magnitude.

6 Discussion of Results

Overall, my results for the full sample of executives suggest elasticities of less than 1, meaning executives have a fairly small response to tax changes. The dollar value estimates for taxable income are similar for methods 1 and 2, and the magnitudes of the coefficients are consistent for the ratio of exercised to vested options across the different periods in method 2. The estimate for the elasticity of taxable income with respect to the current net of tax share is approximately 0.6, and the estimate for the elasticity of options with respect to the current net of tax share is 0.2. The dummy variables for year, in method 1, have signs consistent with the hypothesis and with results from method 2.

¹¹See also Figure 3 in Section 6.

While the estimates for elasticity of taxable income are less than 1 for the full sample of executives, the results for CEOs from 2007 to 2015 are well above 1 for the current net of tax share and less than -1 for the future net of tax share. The results for CEOs in this period are similar to results for all executives from 1991 to 1995 found in Goolsbee (2000c).

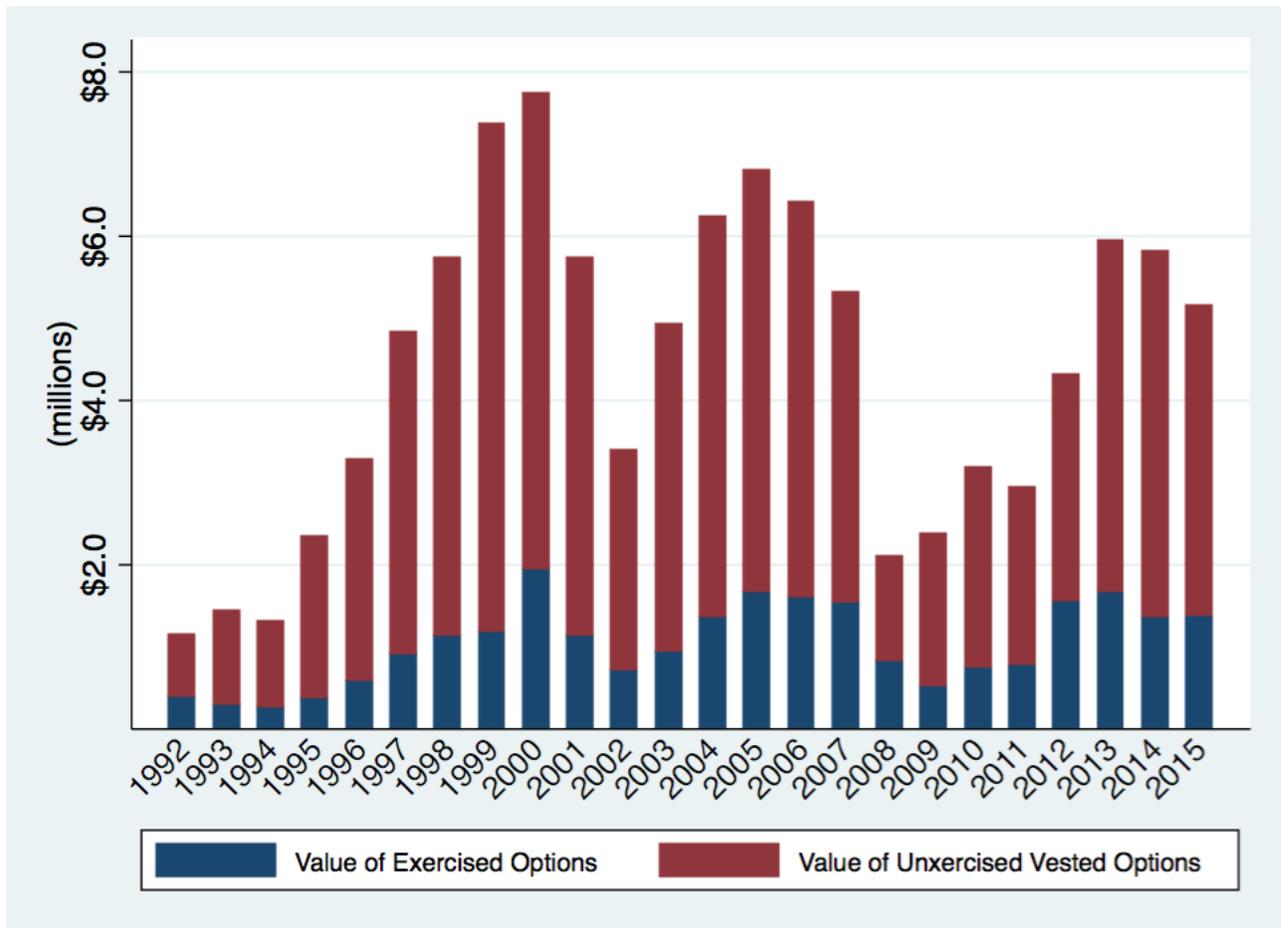
The similarity is probably due to a decision Goolsbee makes to exclude executives with zero dollars of compensation for any category in any year from the sample. This criterion limits the sample to only executives with a large grant of options, such that they exercise some in every year. I choose not to limit my data in this way because it overstates the true ability of an average executive to respond to changes in the tax rate. The results for CEOs are probably similar to the results of Goolsbee (2000c) because CEOs are more likely than non-CEOs to have options in every year, so this sample may be more similar to Goolsbees than the sample of all executives reported on a proxy statement.

Elasticities of taxable income with respect to the current and future net of tax shares for the entire 23-year period of the sample are both positive, contradicting results from other periods. I expect this is due to the lack of variation in the future net of tax share in the period relative to increasing levels of total taxable income over time. Adding 1991 compensation data to the sample would add an additional value of future net of tax share, and allow a researcher to confirm the results of Goolsbee (2000c) for the period from 1992-1997 in addition to over the 23-year period. In future work, researchers could also extend the difference-in-differences method put forward by Goolsbee (2000c) into later periods, taking advantage of the 20% of executives in the sample who face a tax rate less than the top marginal tax rate.

A more challenging problem is that, no matter the specification, results from 1998 to 2006 correspond neither to results in existing literature nor to results in other periods. The signs on the coefficients for current net of income tax share and future net of income tax share are inverted relative to rational behavior. One possible explanation for the result is the confounding historical context. Options issued in 1999 and 2000, at the height of the dot-

com boom, would have been out of the money in the period of tax change. This is reflected in Figure (2), which shows the total value of exercisable options by year. The exercisable value of options in 2001 and 2002, which are the years many of the options issued during the dot-com bubble would have vested, were markedly lower than years before or after. The statistical significance of the coefficients for current net of tax share and future net of tax share is still puzzling.

Figure 3: Mean Value of Vested Exercised and Unexercised Options, 1992-2015



The period from 1998 to 2006 contains tax cuts, in contrast to the tax increases in 1993 and 2013. The results here are complicated by the context I described previously, so existing literature still lacks a real estimate of elasticity of executives in response to tax cuts. To validate the elasticity in case of a tax cut, one could collect compensation data for a period including the Tax Reform Act of 1986. This change in the tax rate is both significant in

magnitude and negative, and would supplement the rate increases contained in the current sample. TRA86 is widely used in papers that estimate the elasticity of taxable income through other means. Any measurement that exploits variation from TRA86 or the Bus tax cuts is still confounded by the effect the tax cut will have on the income share of wealthy taxpayers.

7 Conclusion

Existing literature estimates the elasticity of taxable income by exploiting variation in tax rates from TRA86 and OBRA93 using executive compensation data. More broadly, literature on executive compensation describes the rapid growth of performance-based compensation, including compensation through stock options. Since tax reforms in 1986 and 1993, the share and level of options relative to other forms of compensation has increased dramatically. However, few authors have revisited the elasticity of taxable income with executive compensation data for more recent variations in the top marginal tax rate, though many authors have studied the increasing share of wealth of the 1% wealthiest taxpayers.

This paper uses evidence from executive compensation to revise estimates of the elasticity of taxable income using tax changes in later periods, contemporaneous to the increased use of options in executive compensation. It shows that that most executives have a small, short-term response to changes in the top tax rate, and do not have a long-term response. CEOs are slightly more responsive in the short term, but still do not shift their compensation meaningfully in the long run.

I expected that executives would shift the exercise of their vested options forward, if they anticipate the tax rate increasing in the following year. This would correspond to positive elasticity with respect to the current net of tax share and negative elasticity with respect to the future net of tax share. I use data on executives collected from proxy statements of publicly traded companies, which has the additional benefit of including a measure of an

executives vested, unexercised options to provide a measure of what share of a grant the executive exercises.

I find an elasticity of taxable income with respect to the current net of tax share above 1 only for CEOs in the period from 2007 to 2015. Estimates of elasticity using the larger sample are small; the largest is 0.6. This suggests that, contrary to Feldsteins prediction of the effects of OBRA93, a tax increase would not result in significantly less revenue over a period of several years. At most, there may be a short run shift ahead one period in anticipation of the change.

However, despite using data that includes a period of tax cuts, my results do not offer conclusive insight into behavior in the case of a tax cut. The estimates of elasticity with respect to the current and future tax share contradict rational expectations in the period including the tax cuts, from 1998 to 2006.

Future work should estimate the elasticity of taxable income for executives in the case of a tax cut. This is especially pressing for two reasons: estimates in existing literature vary wildly, with Feldstein (1995) and Goolsbee (2000c) providing contradictory results taken from different legislative changes, and because of recent proposals to reform the tax code. President Trump has offered a tax reform plan which, if passed, would change the federal rate for top earners. An understanding of the behavioral response of the wealthy in relation to tax cuts would improve estimates of the revenue impact of the law.

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