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TAXING THE RICH MORE:
PRELIMINARY EVIDENCE FROM THE 2013 TAX INCREASE

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ABSTRACT

This paper provides preliminary evidence on behavioral responses to taxation around the 2013 tax increase that raised top marginal tax rates on capital income by about 9.5 points and on labor income by about 6.5 points. Using published tabulated tax statistics from the Statistics of Income division of the IRS, we find that reported top 1% incomes were significantly higher in 2012 than in 2013, implying a large short-run elasticity of reported income with respect to the net-of-tax rate in excess of one. This large short-run elasticity is due to income retiming for tax avoidance purposes and is particularly high for realized capital gains and dividends, and highest at the very top of the income distribution. However, comparing 2011 and 2015 top incomes uncovers only a small medium-term response to the tax increase as top income shares resumed their upward trend after 2013. Overall, we estimate that at most 20% of the projected tax revenue increase from the 2013 tax reform is lost through behavioral responses. This implies that the 2013 tax increase was an efficient way to raise revenue.

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A data appendix is available at <http://www.nber.org/data-appendix/w22798>

1. Introduction

One of the most contentious aspects of the tax policy debate is the proper level of taxation of top individual income earners. This question takes particular importance in the United States where income concentration has been growing dramatically over the last 40 years and now stands at extremely high levels. Piketty and Saez (2003) and Piketty, Saez, and Zucman (2016) show that the share of pre-tax income going to the top 1% of income earners has more than doubled from less than 10% in the late 1970s to over 20% in recent years. Progressive individual income taxation modulates the tax burden by size of income and hence is the most direct tool to address growing income concentration. At the same time, it is crucial to understand the economic consequences of taxing the rich more to be able to pick the best tax policy regarding top incomes.

Tax changes naturally offer opportunities to learn about these economic consequences. Since 1980, there has been significant disagreement in the U.S. policy debate over how to tax the rich. Republican administrations have typically decreased taxes, while their Democratic counterparts have typically increased them (although not enough to reverse the decreases). The most recent change took place in 2013 when the top marginal tax rate on capital income increased by about 9.5 points and the top marginal tax rate on labor income increased by about 6.5 points. These increases were largely concentrated within the top 1% and were due to the combination of the Affordable Care Act (Obamacare) surtaxes and the expiration of the 2001 Bush tax cuts for top earners. These tax increases for 2013 surpass in magnitude the 1993 top tax rate increases of the Clinton administration, and are effectively the largest increase in top tax rates since the 1950s. Therefore, they offer a unique opportunity to learn about the economic consequences of taxing the rich more.

In this paper, we present preliminary evidence on the effects of these tax increases. We build upon the large existing literature on estimating behavioral responses to taxation (Saez, Slemrod, and Giertz [2012] provide a recent and comprehensive survey) to offer a simple and transparent analysis of the 2013 tax

increase. We follow the literature and focus on estimating the elasticity of pre-tax reported income with respect to the net-of-tax rate (one minus the marginal tax rate) for various income groups. This parameter is central for estimating the efficiency costs of taxation and for optimal tax analysis. Our analysis uses only the tabulated published statistics produced by the Statistics of Income division of the Internal Revenue Service (IRS). We discuss extensively why we think that these timely and publicly available tabulations are sufficient to assess the broad picture of the behavioral responses to the 2013 tax increase. Our goal is partly pedagogical and shows how simple tabulated information can already yield a number of results that are transparent and easy to understand. Naturally, as we discuss in detail in the concluding section, this broad picture analysis could be further refined using micro level data, and more sophisticated empirical methods as some studies have started doing. Our empirical analysis generates three main results.

First, we analyze short-term responses which are the easiest to identify by comparing 2012 and 2013. The tax change was not formally enacted until early January 2013. However, after the re-election of Barack Obama in early November 2012, it was almost certain that top tax rates would increase significantly, leaving 2 months (November and December 2012) to accelerate income realizations and avoid the 2013 tax rate increases. We find that reported top 1% incomes were abnormally high in 2012 and abnormally low in 2013, which is most likely due to retiming of income in order to avoid the high tax rates of 2013. We estimate that top 1% income earners shifted about 11% of their 2013 incomes into 2012. This implies a large short-run elasticity (in excess of one) of reported income with respect to the net-of-tax rate. This large short-run elasticity is particularly high for realized capital gains and dividends but is also present although less pronounced for other forms of income such as business profits, and wages and salaries. We also find that the short-term elasticity is much higher for very top income groups such as the top 0.1% (or the top .01%) than for the top 1% excluding the top .1%. This shows that the ability to retime income in the short-term is likely limited to very top earners only. This large short-

term retiming responses for top earners line up well with earlier findings in the literature which had also uncovered large retiming responses for realized capital gains in 1986 (Auerbach, 1988) and for stock-option exercises in 1992 (Goolsbee, 2000) following earlier tax rate increases.

Second, we analyze medium-term responses comparing 2011 and 2015. 2011 is the last year unaffected by the 2013 reform as it was clear that tax rates would not change in 2012 due to political gridlock. Over this four-year horizon, top 1% income shares have continued to increase at almost the same rate as from 2009 to 2011, the first two years of recovery for top incomes after the Great Recession. Hence, this suggests that the top tax rate increase has not depressed top incomes in the medium-run and the corresponding medium-term elasticity we obtain is small, around .25. However, it is important to emphasize that this medium-term elasticity is not as compellingly identified as the short-term elasticity. Our small medium-run elasticity estimates rely on the strong assumption that, absent the tax increase, the top 1% income share would have kept growing on its previous post Great Recession trend. We show that this identification assumption holds in the experiences of the previous two recessions of 1991 and 2001.

Third, we consider specifically the case of charitable giving. Charitable giving is a useful element to consider because it can be deducted from income for tax purposes. As a result, the tax incentives for charitable giving move in opposite direction as those for reported income. In the short-term, after the 2013 tax increase became clear, it would have been tax efficient to postpone charitable giving into 2013 as charitable giving would reduce taxes more with the higher tax rates of 2013. However, in contrast to the strong retiming observed for income, we do not observe retiming of charitable contributions from 2012 and 2013 among top 1% income earners. To the contrary, charitable contributions follow closely reported income: they spike in 2012 and are depressed in 2013. This implies that, on average, top earners did not use charitable giving

strategically as a way to avoid taxes.¹ In the long-term since the 1960s, we observe a very parallel trend between top 1% incomes and the charitable contributions of top 1% income earners. This strongly suggests that the extraordinary rise in US top income shares documented by Piketty and Saez (2003) reflects a real phenomenon and is not due to tax avoidance. Indeed, if top incomes in the 1960s or 1970s had been very high in real terms but very low as reported on tax returns because of tax avoidance, we should have observed very high charitable contributions relative to reported incomes among the rich (even more so given the tax incentives).

Overall, our evidence is in line with the literature showing strong short-term behavioral elasticities due to tax avoidance (in the present case, retiming of income) and much smaller medium-term behavioral elasticities (Saez, Slemrod, and Giertz, [2012]). Our estimates imply that the revenue lost due to behavioral responses relative to the mechanical projected revenue increase is at most 20%, which makes the 2013 tax increase an efficient way to raise extra revenue. Therefore, the 2013 tax reform successfully raised extra revenue in a progressive fashion, as the tax increases were mostly concentrated among the top 1%. At the same time, our evidence suggests that, by itself, the 2013 tax increase will not be sufficient to curb the secular increase in income concentration that the US has experienced since the 1970s.

The paper is organized as follows. Section 2 presents the details of the 2013 income tax reform and the potential channels of behavioral responses to taxation it creates. Section 3 presents our empirical findings. It analyzes in turn short-term retiming responses, medium-term responses, and charitable giving among the rich. Next, it discusses the long-term link between top incomes and top tax rates, and finally evaluates the efficiency costs of the 2013 tax increase.

¹ There are other features of the tax code that could potentially have been exploited to retime income away from 2013. For example, since 2010, it is possible to make conversions of traditional IRAs into Roth IRAs with no income limitations. While we see a spike in Roth conversions in 2012, this spike is very small relative to the stock of traditional IRAs that could potentially be converted. This shows that only a small minority of high income earners with IRA balances choose to avoid taxes through Roth IRA conversion.

Section 4 concludes and discusses avenues for future research analyzing the 2013 tax reform using micro-data instead of tabulated data.

2. The 2013 Tax Reform

In this section, we describe in detail the 2013 tax increase for top earners and the behavioral incentives it created. The effects of the 2013 tax reform on federal marginal tax rates is summarized in Table 1.

2.1 Description of the Reform

The 2013 tax reform was a combination of two simultaneous tax increases, the surtax on high income earners due to the Affordable Care Act (ACA) and the expiration of the Bush tax cuts on high income earners. Let us describe each component in turn.²

Affordable Care Act (ACA) surtax: The ACA surtax adds a marginal tax rate of 3.8% on investment income and 0.9% on labor income for high income earners. This tax roughly affects the top 2.5% income earners.³ The rationale for this differential tax rate on investment vs. labor income is to align their tax treatment as labor income also faces a 2.9% FICA (Federal Insurance Contribution Act) payroll tax rate with no cap. Some forms of income (such as non-passive profits of S-corporations, pension distributions, or other income) are neither considered as investment nor labor income and hence are exempt from the ACA surtax and FICA payroll taxes as well. Non-passive profits of S-corporations are in reality a

² The Tax Policy Center provides a comprehensive description of the 2013 tax reform at <http://www.taxpolicycenter.org/statistics/individual> Viard (2013) also presents an excellent description of the 2013 tax increase focusing specifically on capital income.

³ As explained in Table 1, the 3.8% surtax on investment income applies to taxpayers with Adjusted Gross Income (AGI) above \$250,000 for married joint filers, and \$200,000 for singles and heads of households. The 0.9% surtax on labor income applies to labor income above \$250,000 for married joint filers (and \$200,000 for singles and heads of households).

mix of investment and labor income and hence this exemption is a clear loophole in the design of the ACA surtax.

The ACA surtax took place in 2013 but was enacted in March 2010 and hence was anticipated well in advance, but until the presidential election was decided in early November 2012, there was a slight probability that the ACA surtax could have been repealed.

Expiration of the Bush Tax Cuts: The Bush administration tax cuts of 2001 were initially designed to expire at the end of 2010 but were extended for 2 more years in December 2010. In 2012, it was clear that the fate of the Bush tax cuts would depend on the results of the 2012 Presidential election. When President Obama was re-elected on November 6, 2012, it became almost certain that the Bush tax cuts would be repealed for top income earners. The exact form of the repeal did not materialize until January 2nd, 2013 due to protracted negotiations between the Obama administration and Congress.⁴ In particular, the thresholds at which top tax rates would increase were uncertain. The enacted repeal, the American Taxpayer Relief Act of 2012 (ATRA), affected top income earners in two main ways:

1) Top bracket addition: ATRA added a top tax bracket which increased the top tax rates from 35% to 39.6% for ordinary income and from 15% to 20% for dividends and realized capital gains. This new top tax bracket started at \$450,000 of taxable income for married joint filers (\$400,000 for single filers, \$425,000 for head of households filers). It affects about the top 1% of income earners. Approximately, this top bracket increases federal marginal tax rates by about 5 points across all forms of income (5 points for dividends and realized capital gains, 4.6 points for ordinary income) for top 1% income earners.

2) Phasing-out of itemized deductions (Pease provision): itemized deductions are reduced by 3% of AGI in excess of \$300,000 for married joints filers (\$250,000

⁴ It was always clear however that the Bush tax cuts would expire for high income earners. The Obama administration had the upper hand because doing nothing would have resulted in the Bush tax cuts expiring for everybody, an outcome both parties wanted to avoid.

for single filers, and \$275,000 for head of household filers) up to 80% of itemized deductions. Hence, this provision increases the marginal tax rate by 3% of the federal marginal tax rate, i.e. 1.2 points for income in the top bracket ($1.2\% = 3\% \cdot .396$). The marginal tax rate on ordinary income is the relevant concept here as long as tax filers in the top bracket have some ordinary income (and not only tax preferred income). Over 90% of top 1% income earners are affected by this provision so we assume it applies systematically in our marginal tax rate computations.⁵

ATRA also re-introduced the personal exemption phase-out. This phase-out increases marginal tax rates for high but not super high income earners. For joint married filers, the phase-out starts at \$300,000 of AGI for joint married filers and is completed at \$425,000 of AGI. Hence, most top 1% income earners are above the personal exemption phase-out. We will therefore ignore this provision in this study.

Taxpayers who pay the Alternative Minimum Tax (AMT) are much less affected by the top tax rate increase and the Pease provision. However, the AMT affects mostly high but not very high income earners as the AMT top marginal tax rate of 28% is lower than the ordinary tax rate (even more so after the 2013 reform). Hence, the vast majority of taxpayers in the top 1% (and especially the top .1%) are typically above the AMT and hence not affected by the AMT.⁶

Table 1 summarizes the effect of the 2013 tax reform on top federal marginal tax rates combining federal individual income taxation and uncapped federal payroll taxes. The first three columns present the pre-reform marginal tax

⁵ Less than 10% of top 1% income earners hit the 80% cap. These taxpayers are mostly concentrated in states with no income taxes (based on the author's computations using the Public Use tax return data file for year 2010).

⁶ Income tax statistics for 2014 show that 36.7% of taxpayers with income above \$.5m (roughly the top 1%) pay some AMT, and 19.4% of taxpayers with income above \$2m (roughly the top .1%) pay some AMT (Tables 1.1 and 3.1 of US Treasury, Statistics of Income for year 2014). The AMT treats dividends and realized capital gains very similarly as the standard tax system (so that their tax rate also goes up from 15 to 20% for high income taxpayers). The AMT also imposes higher marginal tax rates in its AMT exemption phase-out range so that the reduction in actual marginal tax rates is actually quite modest. For simplicity, we ignore the AMT in our marginal tax rate computations.

rates, the post-reform marginal tax rates, and the change pre to post-reform, respectively. The next three columns show the income thresholds at which the tax changes apply for married joint filers, heads of households, and singles. Panel A presents the health care tax (including the uncapped portion of FICA payroll taxes on earnings). This tax applies to labor and investment income when total gross income is above the stated thresholds. Panel B presents the individual income tax including the change in the top bracket tax rate and the limitation on itemized deductions. Ordinary income includes all forms of taxable income other than qualified dividends and long-term realized capital gains, which are taxed at lower rates (as shown in the table). Panel C shows the total effect of the 2013 tax reform on marginal tax rates for each specific income component. Panel D shows the total effect of the 2013 tax reform on marginal tax rates by income groups. Panel D1 considers income including capital gains while Panel D2 considers income excluding capital gains. In panels D1 and D2, the average is taken using the income composition of the top income groups in 2011 (the latest year not affected by the 2013 tax reform). Panels D1 and D2 show that the 2013 tax reform increased marginal tax rates by about 7 points on average for top income groups, with slightly higher increases at the very top (top .1% and top .01% groups) and for income including realized capital gains (Panel D1). Note also that the average marginal tax rate decreases with income (both pre and post-reform) and particularly for income including realized capital gains because the fraction of income that is tax preferred (capital gains and dividends) is higher at the very top.

In sum, the effects of the 2013 tax increase are limited to taxpayers with income above \$250,000, i.e. approximately the top 2.5% of income earners. Within the top 2.5%, the effects of the 2013 tax increases apply fully to individuals with gross income above about \$500,000, approximately the top 1%. For this top 1% group, the 2013 tax reform increases the marginal tax rate on labor income by about 6.5 percentage points and it increases the marginal tax rate on capital income by about 9.5 percentage points. Overall, taking into account that some income forms are exempted from ACA, the total average

effect on the marginal tax rate of the top 1% is slightly above 7 percentage points (Table 1).

2.2 Expected behavioral responses:

What are the expected responses to the 2013 tax reform based on the voluminous past literature on behavioral responses to taxation? Let us analyze in turn expected short-term responses, medium-term responses, and distinguish between real responses vs. tax avoidance responses as the literature has done following the key impetus of Slemrod (1995). As we know from the literature, behavioral responses are largest along the tax avoidance margin, whenever a tax reform creates tax avoidance opportunities. It is much harder to uncover compellingly real responses.

1) Retiming responses: The 2013 top tax rate increase and its magnitude became almost certain after the 2012 Presidential election in early November 2012. A simple way individual taxpayers can respond to the tax change is by re-timing income from 2013 (when tax rates will be higher) toward 2012 (when tax rates are still lower). Indeed, for top 1% income earners, shifting \$100 in capital income from 2013 to 2012 saves about \$9.5 in taxes. Shifting \$100 in labor income from 2013 to 2012 saves about \$6.5 in taxes. Hence, if re-timing income is feasible for the taxpayer, it is certainly an attractive way to avoid some of the 2013 higher taxes. The past literature has shown that two categories of income can lead to strong re-timing responses: realized capital gains and stock-option exercises.

Taxpayers choose when to realize capital gains. Hence, realizing gains in late 2012 is obviously tax-advantageous relative to realizing in 2013 or after. The Tax Reform Act of 1986 increased the tax rate on realized capital gains from 20% to 28% and hence created a similarly strong incentive to accelerate realized capital gains. This earlier tax rate increase affected almost all reported realized capital gains. Auerbach (1988) documented a famously strong response along

this margin: capital gains realizations in 1986 were extremely high (twice as high as in 1985) and were correspondingly depressed in 1987. As top 1% income earners report about 80% of total realized capital gains (Piketty and Saez, 2003), we should expect a strong aggregate response to the 2013 tax increase as well.

Similarly, executives who hold vested stock-options can time the date of exercise of their stock-options. Profits from (most) exercised stock-options are considered wage income for tax purposes, hence, such re-timing should create a spike in wage income for top earners in 2012. The Clinton 1993 tax increase created a similar incentive as it increased the top income tax rate from 31% to 39.6% (the reform did not affect the tax rate on realized capital gains). Goolsbee (2000), using executive compensation data for publicly traded firms, documented a large spike in stock-option realizations in 1992.

Therefore, we expect the re-timing responses along the realized capital gains, and stock-option exercise dimension to be particularly large for the 2013 tax increase. Other forms of income could also be re-timed. Employer and employees could potentially agree to shift wage income (such as bonuses) into 2012. Business income can be re-timed by postponing costs (such as deploying investment) into 2013 and accelerating sales into 2012. Dividends, particularly in closely held firms, could also be accelerated in 2012.⁷ For top bracket taxpayers, pension distributions from individual accounts such as 401(k)s and IRAs could also be accelerated into 2012 (and save \$4.6 per \$100 shifted into 2012 as pension income does not face the ACA surtax). In particular, for high-income taxpayers owning IRA accounts, conversions from traditional IRAs into Roth IRAs can be accelerated into 2012 (with no limit on the amount rolled over and no AGI limit nor any age requirement). Converting a traditional IRA into a Roth IRA requires paying income taxes on the converted amount (and no further tax will be due when Roth IRA funds are eventually withdrawn).

⁷ Regular dividends of publicly traded firms are typically stable. However, even publicly traded firms could make extra special dividend payments in 2012. See Chetty and Saez (2005) for an analysis showing a strong response of dividends (and particularly special dividends) among publicly traded firms to the earlier 2003 dividend tax cut.

Conversely, high income individuals have an incentive to postpone charitable giving from 2012 to 2013 so that charitable giving offsets income facing a higher marginal tax rate, saving \$4.6 in taxes per \$100 of postponed gift (charitable giving cannot offset the ACA surtax). Indeed, a large literature has shown that charitable giving can be fairly responsive to tax incentives particularly in the short-run (see e.g., Clotfelter [1985] or Fack and Landais [2016] for literature surveys). Hence, we should expect a trough in charitable giving in 2012 followed by a sharp increase in 2013.

2) Income shifting responses: The Tax Reform Act of 1986 is well known to have generated a large shift in business income from the corporate sector toward the individual sector (by converting C-corporations whose profits are first taxed by the corporate income tax into S-corporations or partnerships that are pass-through entities whose profits are taxed solely at the individual level). See Auerbach and Slemrod (1997) and Saez (2004) for detailed discussions. This large shift occurred because, after 1986, it became more advantageous to organize as a pass-through entity to be taxed solely at the individual level rather than be a C-corporation and pay the corporate income tax (and then an additional individual income tax when profits are distributed in the form of dividends or realized capital gains). The 2013 individual income tax increase on top earners is not large enough to reverse this logic. It still remains advantageous to pay the top individual rate of 39.6% rather than the corporate income tax rate of 35% plus some additional individual income tax when profits are distributed as dividends or realized capital gains.⁸ The ACA surtax does not tax non-passive profits from S-corporations while it does tax dividends and realized capital gains, which is a further advantage of the S-corporation form.⁹ Indeed, the 1993 individual top tax rate increase (from 31% to 39.6%) did not lead to a shift back

⁸ The corporate tax form makes sense only in the extreme case where a person will never want to distribute dividends or realize profits before death. At death, unrealized capital gains benefit from the step-up of basis and hence escape individual taxation entirely.

⁹ Partnership profits in contrast are taxed by the ACA surtax (non-passive partnership profits were already taxed by the Medicare uncapped payroll tax).

toward the corporate form and we should not expect to see such a shift with the 2013 reform.

Another important avenue for tax avoidance is to exploit the tax preferred treatment of realized capital gains by trying to transform ordinary income into realized capital gains. The most famous example is the carried interest for private equity and hedge fund managers. The 2013 tax reform however increased tax rates on realized capital gains slightly more than other forms of capital income (see Table 1) and significantly more than on labor income. As a result, we should not observe shifting toward realized capital gains.

3) Real responses: As just discussed, we should not expect the 2013 tax reform to generate tax avoidance through permanent income shifting. Hence, any permanent change in reported incomes after the 2013 tax reform (and after the re-timing effects discussed above have phased out) should be due to real effects. As discussed in Piketty, Saez, and Stantcheva (2014), real changes in reported incomes of top earners due to tax rate changes could be due to supply side responses or rent-seeking responses.

Supply side responses: With the higher top tax rate, the marginal reward to work and from returns on wealth is reduced, which could potentially lead to lower work and savings, and reduce reported labor income and capital income. In the literature on reported income responses, it is very difficult to estimate real responses, especially at the high-income end.¹⁰ The main challenge is that measuring the actual work effort and savings of high-income earners is particularly difficult given data availability.¹¹ Perhaps a useful avenue for future

¹⁰ There is a large literature estimating the effects on work of means-tested transfer programs and the Earned Income Tax Credit (EITC). See Moffitt (1992, 2002) for reviews of labor supply responses to welfare programs and the EITC.

¹¹ One important and valuable exception is Moffitt and Wilhelm (2000) who used survey of consumer finance data to measure the hours of work response to the Tax Reform Act of 1986. They find that the surge in the taxable income of high-income individuals between 1983 and 1989 was not accompanied by an increase in reported hours of work. This suggests that the response to the Tax Reform Act of 1986 was not due to supply side responses.

research would be to look at retirement behavior of high-income earners, which can be inferred reasonably well from tax data.

Rent-seeking responses: Piketty, Saez, and Stantcheva (2014) define rent-seeking responses as tax driven changes in the real incomes of top earners that are not due to changes in the actual economic contribution of top earners but are rather due to changes in how much income top earners can extract (at the expense of the rest of the economy). Obtaining compelling evidence of rent-seeking effects is also challenging.

In the case of the 2013 tax increase, we want to analyze whether the tax increase did slow down the path of growth of top incomes (relative to average income). Disentangling supply-side responses vs. rent-seeking responses is particularly difficult.

3. Behavioral Responses to the 2013 Tax Reform

In this section, we analyze the behavioral responses to the 2013 tax increase. Our basic empirical strategy is to analyze top 1% income earners (the treatment group most affected by the reform). We will also consider two control groups: the next 4% (top 5% excluding the top 1% which we call the top 5-1%) and the bottom half of the top decile (top 10% excluding the top 5% which we call the top 10-5%). These two control groups are much less affected by the 2013 tax increase. The top 10-5% group, comprised of families with pre-tax gross incomes between \$120,000 and \$170,000 in 2013, is essentially unaffected by the 2013 tax reform. The top 5-1%, comprised of families with incomes between \$170,000 and \$400,000 in 2013, is affected by only a small fraction of the 2013 tax increases.¹²

¹² Top 5-1% are unaffected by the top individual income tax rate increase. As over 90% of the incomes of the top 5-1% is from labor (wages and salaries, pensions, and self-employment business income, see Piketty and Saez [2003] series), only the modest 0.9% ACA surtax rate on labor income applies to the vast majority of their income.

The simplest and most transparent way to represent the evolution of the incomes in these groups is to look at the share of total income accruing to each of these groups using the Piketty and Saez (2003) series, updated to 2015. Top income shares show how the incomes of these groups evolve relative to the average income in the economy, hence controlling for overall economic growth, nominal changes, and population growth. Groups are defined relative to the total number of US families (including non-filers). Income is defined as gross income reported on tax returns including realized capital gains and excluding government transfers (such as social security benefits and unemployment insurance). These top income shares can be computed with micro-level tax return data (publicly available up to tax year 2010) but also with much simpler tabulations by size of income published by the Statistics of Income division of the IRS in a timely fashion and available up to tax year 2015 (US Treasury Department, Statistics of Income, annual publication). Feenberg and Poterba (1996) pioneered the use of top income shares to analyze the effects of taxes on top reported incomes. Saez (2004) and Saez, Slemrod, and Giertz (2012) showed how to use top shares to estimate behavioral elasticities.

Figure 1 depicts the share of income earned by the top 1% of families series (in black triangles on the left y-axis scale) and the top marginal tax rates (on the right y-axis scale) from 1962 to 2015. We focus on a fairly long period from 1962 to 2015 so as to give historical perspective. As we shall see, this chart contains valuable information on responses of top income earners to tax rates. The top marginal tax rate for the federal individual income tax for ordinary income is depicted in solid line. This ordinary top income tax rate incorporates the uncapped payroll tax rate (equal to 2.9% of earnings starting in 1994) and the ACA surtax starting in 2013 (and described earlier). We include only 50% of the uncapped payroll tax rate as it applies only to earnings, which represent about half of incomes reported by the top 1% (Piketty and Saez [2003]). We include only 80% of the ACA surtax (as the ACA surtax does not apply to about 20% of incomes reported by the top 1%).

3.1 Short-term responses evidence

Overall income response: Let us start with the short-run response to the 2013 tax increase. The top 1% income share depicted in Figure 1 displays a clear spike in 2012. The top 1% income share surges by 3.2 points from 19.6% in 2011 to 22.8% in 2012. This is actually the largest year-to-year increase since 1986 when the top 1% income share also increased by 3.2 points. As we discuss below in detail, the 1986 spike was also tax reform driven. This spike in 2012 is followed by a trough in 2013 when the top 1% falls by 2.8 points down to 20.0%. This fall is as large as the fall from 2008 to 2009 during the Great Recession. The top 1% also fell sharply (by 3.3 points) in the recession of 2001 when the stock market crashed. There was another sharp fall in 1987, which is also tax reform driven. Hence, the historical perspective since 1962 provided by Figure 1 shows a clear extraordinary spike in 2012 followed by a trough in 2013. As both 2012 and 2013 were similar in terms of macro-economic growth (moderate growth rates in both years) and stock market gains (strong gains in both years), the spike and trough cannot be explained by macro-economic conditions. Hence, we can with great confidence conclude that the spike in 2012 and trough in 2013 are due to the 2013 tax reform. The most plausible explanation is income retiming. The magnitude of the spike and trough in 2012-3 is slightly lower than the spike and trough of 1986-7 which was due entirely to realized capital gains retiming as the tax rate on realized capital gains increased by 8 points from 20% to 28% while the ordinary income tax rate was actually cut substantially (from 50% to 28%) as shown in Figure 1.¹³ The magnitude of the spike and trough in 2012-3 is much larger than the spike and trough in 1992-3. The 1992 reform did not affect the tax rate on realized capital gains and hence retiming was due only to ordinary income (Goolsbee [2000] showed a strong retiming response for executive stock-options). These comparisons with earlier reforms suggest that realized capital

¹³ Auerbach (1988) analyzes in detail the realized capital gains response to the Tax Reform Act of 1986.

gains must be a very significant driver of the 2013 tax reform response, a point we discuss in detail below.

Figure 2 offers additional evidence by depicting the top 5-1% and top 10-5% income shares. We have not repeated the top marginal tax rates from Figure 1 to avoid cluttering the figure. For these control groups (or quasi-control group in the case of the top 5-1%), there is no evidence at all of a spike in 2012 followed by a through in 2013. If anything, there is a slight trough in 2012 due to the fact that top 1% incomes surged, and made the denominator slightly and abnormally larger in that case, depressing the income shares for groups below the top 1%. Note that the absence of short-term retiming in groups below the top 1% was also true for earlier tax reforms like the 1986 tax reform and the 1993 tax reform. Hence, examination of these control groups further reinforces our confidence that the spike and trough in 2012-3 for the top 1% were indeed tax driven.

Figure 3 breaks down the top 1% into the top 0.1% and the next 0.9% (top 1-0.1%). The top 0.1% is comprised of families with annual incomes over \$2m in 2015. The next 0.9% is comprised of families with annual incomes between \$450,000 and \$2m in 2015. The top 0.1% income share is depicted in black triangles while the next 0.9% income share is depicted in full circles. The most interesting feature of this chart is that the 2012-3 spike-trough phenomenon is magnified for the top 0.1% and correspondingly much weaker for the next 0.9%. Even though the income shares for the two groups are of comparable magnitude in recent years (around 10% of total income), the increase from 2011 to 2012 is only .7 points for the top 1-.1% while it is 2.4 points for the top .1%, i.e., 3.5 times larger. Similarly, the fall in top income shares from 2012 to 2013 is also 3.5 times larger for the top 0.1% than for the next 0.9%. The same differences in the magnitude of responses also arose in the retiming responses following the 1986 tax reform and the 1993 tax reform. In both of these cases, the spike-trough responses are about 3 times larger for the top 0.1% than for the next 0.9%. This suggests that very top income earners have much more ability to avoid taxes by retiming income than high (but not super high) income earners. Below, we will

estimate the corresponding behavioral elasticities by income groups to quantify these qualitative findings.

Anatomy of the response: Figure 4 depicts the share of income earned by the top 0.1% of families and its decomposition. Panel A considers income including realized capital gains and decomposes it into (a) realized capital gains, (b) income excluding realized capital gains. Panel B considers income excluding realized capital gains and decomposes it into (a) salaries (includes all wages and salaries and pensions), (b) business income (includes profits from sole proprietorships, partnerships, and S-corporations), (c) capital income excluding dividends (includes interest, rents and royalties, and estate and trust income), (d) dividends. Note that the share of income excluding capital gains in Panel A is lower than the total income share excluding capital gains in Panel B. This is because tax filers are ranked by income *including* realized capital gains in Panel A while they are ranked by income *excluding* realized capital gains in Panel B.

We focus on the top 0.1% because Figure 3 showed that the bulk of the short-term retiming response was concentrated within that group, making the compositional analysis easier to see. Confirming our earlier conjecture, Panel A shows that it is indeed the case that the majority of the spike-trough response in 2012-3 is due to the realized capital gain component. This implies that income components (other than realized capital gains) have also responded to the 2013 tax reform albeit in a muted way. Panel B shows that 3 out of the 4 components depicted, namely wages and salaries, business income, and dividends have responded to the tax reform, while the other capital income component does not show any response. The business income response is fairly modest. The salaries response is somewhat stronger and clearly visible in Figure 4, Panel B. This suggests that stock-options were not very aggressively used to retime income. It is interesting to note that the response of salaries is somewhat weaker around the 2013 reform than around the 1993 reform. Panel B shows that dividend income has responded very strongly to the tax change. The response of dividend income is actually close in relative magnitude to the response of realized capital

gains. We suspect that the response of dividend income is due to special onetime dividends paid out specifically to game the 2013 tax reform. Publicly traded firms can sometimes use such special dividends as they did around the 2003 dividend tax cut (Chetty and Saez, 2005). Indeed, using data on publicly traded firms, Perez Cavazos and Silva (2015) show that firms retimed dividend payments to take advantage of the tax differential. Private equity funds have also been known for extracting cash from the privately held corporations they control by generating special dividend payments (see e.g., Appelbaum and Batt, 2014). It is conceivable that private equity funds used special dividends to time the reform as well. Interestingly, dividend income did not respond to the 1993 tax reform, even though the tax incentive to do so was almost the same. However, in 1992-3, dividend distributions were a clearly dominated form of profit distribution relative to retaining profits and realizing capital gains. This shows that tax avoidance techniques, even as simple as retiming, evolve over time depending on the overall tax system leading to different magnitudes of responses.

One issue when considering specific income components in Figure 4 Panel B is that families are ranked by total income. Hence, if one component responds strongly (such as dividends), it might tilt the composition of top income earners toward dividend income (and away from other components), hereby magnifying the response of dividends and depressing the response of other components. This issue can be addressed by looking separately at each income component. We do so for wage income as Social Security Administration produces a very valuable and timely annual tabulation of individual wage income (from forms W2) starting with year 1990.¹⁴

Using these wage income statistics, Figure 5 depicts the share of wage income earned by the top 0.1% individuals (ranked by wage income relative to the potential population of employees) since 1990.¹⁵ Wage income is defined as

¹⁴ This tabulation is posted online at <https://www.ssa.gov/cgi-bin/netcomp.cgi?year=2014>

¹⁵ The top 0.1% is relative to the total potential population of employees defined as 85% of the full US population aged 20-64. We choose a fixed fraction of the working age population to incorporate the effects of fluctuations in employment in our wage income concentration series. In year 2000, when the unemployment rate is slightly below 4%,

W2 wage income (wages, salaries, and tips) inclusive of elective retirement contributions (such as 401(k) contributions). Wage income also includes bonuses, and profits from exercised stock-options.

The pattern of the top 0.1% wage income share in Figure 5 is actually very similar to the pattern of the top 0.1% wage income component from Figure 4, Panel B. This shows that the re-ranking issue is not a major issue (a point we confirm with our elasticity estimates below). In particular, Figure 5 shows a clear spike in the top 0.1% wage income share in 2012 followed by a trough in 2013. The magnitude of the spike is clearly more modest than for overall income, confirming the fact that wage income responds less than overall income (and particularly overall income including realized capital gains). Figure 5 also shows a very clear spike as well in 1992 in anticipation of the 1993 top tax rate increase.

Elasticity estimates: Next, we quantify the size of the behavioral retiming response in the short-run by estimating the elasticity of income with respect to the net-of-tax rate. The net-of-tax rate is defined as one minus the marginal tax rate. This elasticity measures the percent change in reported income when the net-of-tax rate increases by 1 percent. The short-term elasticity measures the change in incomes in 2013 vs. 2012 that is driven by the tax change. The short-term elasticity estimate e_S can be estimated as follows:

$$e_S = (\log sh_{2013} - \log sh_{2012}) / (\log(1 - MTR_{2013}) - \log(1 - MTR_{2012})), \quad (1)$$

where sh_t denotes the share of income going to the top 1% in year t , MTR_t denotes the marginal tax rate faced by the top 1% in year t . Equation (1) provides an unbiased estimate of e_S if, absent the tax change, the share of income going to the top 1% would have *stayed constant* from year 2012 to year 2013. Under this key identification assumption, the estimate e_S picks up the log change in

the ratio of the employed population (full-time plus part-time employees in National Accounts series) to the population 20-64 reaches its highest level at 82.4%. Hence, 85% of the population aged 20-64 can be seen as a reasonable benchmark for the maximum potential population of employees.

income triggered by the log change in the net-of-tax rate. Using shares of income—as opposed to real incomes—naturally controls for overall economic growth and is reasonable as long as the tax responses have minimal impact on aggregate incomes (i.e., does not affect the denominator of the income share). This is a valid approximation in our case where the top 1% captures only about 20% of total income.¹⁶ Repeated cross sectional comparisons provide the simplest and most transparent elasticity estimates. Saez (2004) and Saez, Slemrod, and Giertz (2010) discuss in detail their properties.

Intuitively, behavioral responses to taxation such as tax avoidance, retiming, or real responses are going to affect the cross-sectional distribution of income across years, and in particular how individuals affected by the reform (the top 1% for the 2012-3 reform) do relative to the rest (bottom 99%). Analyzing top income shares built from repeated cross sections of annual income is the most transparent way to show how top incomes do relative to economy wide average incomes. Importantly, repeated cross-sectional analysis is robust to the presence of year-to-year income mobility within individuals. Longitudinal analysis using panel data can be useful to refine the analysis of retiming as we discuss in conclusion.

Is the identification assumption of stability of top income shares (absent the reform) satisfactory? To a first approximation it is as the year-to-year change from 2012 to 2013 of 3 points is much larger than in other years. Yet, there is obviously both a long-term upward trend in top 1% income shares from less than 10% in the late 1970s to over 20% in recent years. This means that the top 1% income share has increased on average by .32 points per year from 1978 (the year before the top 1% income share starts to increase) to 2011 (the last year before the 2013 tax change has an impact). There is also a medium-term upward trend in the top 1% income shares due to the recovery from the sharp drop during the Great Recession. From 2009 to 2011, the top 1% increased by .75

¹⁶ An alternative would be to use as denominator the share of income going to the bottom 99% which would purge the denominator of tax effects. We stick to using top income shares for simplicity.

points per year. Hence, it is conceivable that, absent the reform, the top 1% income share would have increased from 2012 to 2013, because of its secular trend upward and also because of the medium-term recovery from the Great Recession. This increase goes against the behavioral response due to retiming and hence leads to downward bias in our estimate of e_S from equation (1). If we think that (log) top income shares would have increased by $\Delta \log sh$ absent the reform then the elasticity estimate for e_S would be:

$$e_S = (\log sh_{2013} - \log sh_{2012} - \Delta \log sh) / (\log(1-MTR_{2013}) - \log(1-MTR_{2012})). \quad (2)$$

In our estimates of e_S , we consider two alternative assumptions for $\Delta \log sh$. First, we assume that $\Delta \log sh$ is equal to the long-term secular trend from 1978 to 2011. Second, we assume that $\Delta \log sh$ is equal to the medium-term recovery trend from 2009 to 2011. In both cases, $\Delta \log sh$ is small relative to the actual log change in top income shares ($\log sh_{2013} - \log sh_{2012}$) so that the resulting elasticity estimates are not very sensitive to our identification assumption. In any case, the benchmark assumption $\Delta \log sh = 0$ implicit in equation (1) is a conservative assumption and hence our benchmark elasticity estimate can be seen as a lower bound conservative estimate. The key point is that this lower bound estimate is large for top income groups and specific income components showing that retiming is a significant tax avoidance avenue in the short-run.

Table 2 presents formal estimates of the short-run elasticity e_S for various income groups, and various specific income components under various identification assumptions. Each of the four columns considers a specific income group: (1) top 1%, (2) top 1-.1% (top 1% excluding the top .1%), (3) top .1%, (4) top .01%. Panel A describes the computations in detail for the elasticity of total income including capital gains with respect to the net-of-tax rate. The elasticity is estimated as the ratio of the log-change in top income shares from 2012 to 2013 to the log-change in net-of-tax rates as in equation (1). Net-of-tax rates are computed from Table 1. The benchmark estimates of Panel A assume no

change in top income shares absent the tax reform. Panel B presents two alternative identification assumptions. The first row of Panel B assumes that top income shares would have increased as the secular long-term average from 1978 to 2011. The second row of Panel B assumes that top income shares would have increased as the medium-term post Great Recession increase from 2009 to 2011.

In Panel C, we compute elasticity estimates for specific income components. The elasticities are defined again using equation (1) but sh_t is now defined as the ratio of the specific income component earned by the top income group to total income economy wide in year t . For example, for realized capital gains, sh_t is defined as realized capital gains earned by the top 1% (ranked by total income) divided by total income in the economy in year t . The advantage of dividing by total income is that the elasticity captures the growth in volume of the specific income component. For example, aggregate realized capital gains are much larger in 2012 than in 2013 because 80% of capital gains are reported by the top 1%. Hence, dividing by total income (instead of total realized capital gains) is more appropriate.

Paralleling the evidence from Figure 4, Panel C displays elasticities for specific income components. The first row repeats the total income with capital gains from Panel A. The second and third row split total income into realized capital gains and income excluding realized capital gains as in Figure 4, Panel A. The next rows split income excluding realized capital gains into: wages and salaries, business income, dividends, and other capital income (interest, rents, royalties, and estate and trust income) as in Figure 4, Panel B.

Panel D computes elasticities around earlier reforms. The first row considers realized capital gains around the Tax Reform Act of 1986 which increased the capital gains tax rate from 20 to 28%. The remaining rows focus on the 1993 top tax rate increase from 31% to 39.6% considering first overall income excluding capital gains and next wages and salaries specifically. Three findings stand out of Table 2.

First, as suggested by the graphical analysis, Panel A shows that the short-run elasticities are large especially for very top income groups. The elasticity for the top 1% is 1.16. The elasticity for the top 1-.1% is much lower at 0.45, and correspondingly, the elasticity for the top .1% is higher at 1.84. The elasticity for the top .01% is even higher at 2.18. As we discussed, these elasticities are conservative as they assume that top income shares would have stayed constant absent the reform. Panel B shows that we obtain somewhat higher elasticities when assuming that top income shares would have kept growing absent the reform. The important point however is that for the reasonable assumptions in Panel B, the change in the size of the elasticity estimates is fairly small relative to the size of the baseline estimates. The top 1% elasticity grows from 1.16 in our baseline, to 1.30 if we assume that top income shares would have grown as in their long-term trend from 1978 to 2011. The elasticity estimate grows to 1.49 if we assume that top income shares would have grown as in their medium-term trend post-Great Recession from 2009 to 2011. Hence, the evidence is very compelling that the short-run elasticity is large, in excess of one and very likely below 1.5 for the top 1% as a whole.

Second, Panel C confirms that there is very wide variation in the short-term elasticity estimates across different income components, as we saw in Figure 4. Realized capital gains are extremely elastic with an estimated elasticity above 3 (for the top 1% as a whole). Even for the top 1-.1%, the elasticity is almost 2. Income excluding realized capital gains is correspondingly less elastic but it still displays a sizeable short-term elasticity of .73 for the top 1%, and is also higher for the very top groups (1.19 for the top .1%). Within income excluding realized capital gains, there is also significant heterogeneity in responses. Wages and salaries are slightly less elastic, with a top 1% elasticity of .44. The wages and salaries elasticities for the top 1-.1% is small at .13. The elasticities of wages and salaries for the very top groups .1% and .01% are pretty high, in excess of one. This is consistent with the scenario whereby only very high salaried individuals are able to retime their earnings, perhaps through stock-option exercises. We also use Social Security Administration data on wage

income (depicted in Figure 5) to compute elasticities of wage earnings using solely the wage income distribution at the bottom of Panel C. These elasticities computed using wage income are actually very close to the elasticities computed using the wage income component of total income. This shows that composition effects due to differential responses of different income components have only a minor impact on our estimates, and hence that our basic approach using income components of total income is acceptable.

Business income is only moderately elastic and not more elastic at the very top than in the top 1-.1%. Ordinary capital income is quite elastic with the response concentrated in the dividend income category and low elasticities for other forms of ordinary capital income (which include interest, rents, royalties, and estate and trust income). Dividend income is about as elastic as realized capital gains, slightly less so in the top 1-.1% and even more so in the top .1% and top .01%. This suggests that corporations were able to pay out extraordinary dividends in 2012 to take advantage of the low rate, particularly corporations owned by very high income earners.

Third, it is interesting to contrast the elasticity estimates for 2012-3 with the elasticity estimates for earlier reforms presented in Panel D. Realized capital gains in 1986 displayed an enormous elasticity around 10, for all groups within the top 1%. Hence, the 1986 response of realized capital gains was much larger. The enormous response of realized capital gains to the 1986 tax reform is well known “the stuff of legend” as Slemrod (1996) emphatically wrote. The larger elasticity in 1986 could be due to longer advance notice relative to the 2013 tax increase.¹⁷ The elasticity of income excluding capital gains around the 1992 reform was smaller than in the 2012 reform: 0.32 in 1992-3 vs. 0.73 in 2012-3. However, the wages and salaries elasticity was comparable (0.32 in 1992-3 vs. 0.44 in 2012-3) across reforms. The response of salaries at the very top (top .01%) was actually even higher in 1992 than in 2012. Dividends in 1992-3 were totally unresponsive to the tax reform in sharp contrast with 2012-3. It is possible

¹⁷ The Tax Reform Act of 1986 was formally enacted on October 22, 1986 but it had passed the House on December 1985 and the Senate in June 1986 so that its broad features were known many months in advance.

that the 2003 dividend tax cut taught companies to use special dividends for tax avoidance (Chetty and Saez [2005]) and that the development of private equity has also increased the volume of strategic dividend payments that can also be timed for tax avoidance (see Appelbaum and Batt [2014] for a detailed discussion of the use of special dividends payments from companies controlled by private equity funds).

3.2 Medium-term responses evidence

Next, we turn to the estimation of medium-run responses where we compare year 2011, the latest year unaffected by the 2013 tax reform and year 2015, the third year post-reform and the most recent year currently available.¹⁸

Looking more broadly in Figure 1 at the evolution of the top 1% after the tax reform, we can see that the top 1% income share resumes its upward trend after 2013. In particular, the top 1% income share rebounds strongly from 20% in 2013 to 21.4% in 2014. By 2015, the top 1% income share is 22.0% and is actually close to its 2012 peak level of 22.8%. This implies that the 2013 reform depressed top income shares only temporarily in 2013 (as part of the retiming response discussed above). Therefore, in the medium-term, the response to the tax reform appears to be much smaller. Figure 3, which splits the top 1% income share into the top .1% income share and the next .9% (top 1-.1%) income share, shows similar evidence. Figure 4 also shows that realized capital gains resume their upward trend after 2013.

Following our earlier discussion, we can estimate the medium-term elasticity e_M as follows:

$$e_M = (\log sh_{2015} - \log sh_{2011} - \Delta \log sh) / (\log(1-MTR_{2015}) - \log(1-MTR_{2011})), \quad (3)$$

¹⁸ Importantly, 2015 estimates are extrapolated based on preliminary tabulations posted by the Statistics of Income division of the IRS for tax returns processed up to late-May 2016 (online at <https://www.irs.gov/uac/filing-season-statistics>). Final statistics for 2015 based on all returns are not available until August 2017. Estimates from prior years show however that preliminary statistics are generally very close to final statistics (Saez, 2008 and updates).

where sh_t is the top income share in year t and MTR_t the marginal tax rate for the top income group in year t and $\Delta \log sh$ is the counterfactual log change in top income shares from 2011 to 2015, if the 2013 tax reform had not taken place. The difficulty is to determine what the appropriate counterfactual $\Delta \log sh$ should be. The medium-term elasticity spans 4 years while the short-term elasticity estimated in the previous section spanned only 1 year. Hence, the counterfactual assumption has 4 times as much impact for the medium-term elasticity than for the short-run elasticity. This makes the identification of the medium-run elasticity much more challenging.

Our earlier assumption of constant top income shares from 2011 to 2015 absent the reform would generate negative elasticities as top income shares actually grow from 2011 to 2015. Hence, this is not a realistic assumption. Absent the reform, top income shares would clearly have grown as well, but by how much? We consider again two possible assumptions, illustrated in Figure 6, Panel A. The figure depicts the share of income earned by the top 1% of families in black triangles. The figure also depicts two counterfactual trends for the top 1% income shares. First, the figure depicts (in solid circles) the long-run straight-line upward trend from 1978 to 2011. 1978 marks the beginning of the long-term increase in the top 1% income share. 2011 is the last year not affected by the 2013 tax reform. Second, the figure depicts (in diamonds) the medium-run straight-line extrapolated linearly from the evolution of the top 1% income share from 2009 to 2011 after the Great Recession. We use these two counterfactuals in the estimation of the behavioral elasticity of income with respect to the net-of-tax rate following the 2013 tax reform.

Examining Figure 6, Panel A, the more aggressive medium-term upward trend appears to be the more reasonable counterfactual as top income shares have increased sharply after the earlier (although milder) recessions of 1992 and 2001. Indeed, following the previous recessions of 1992 and 2001, the path of recovery of the top 1% income share was very close to the linear extrapolation of the first two years of recovery (1992 to 1994 and 2002 to 2004) as depicted in

Figure 6 for comparison purposes. In contrast the long-term secular trend from 1978 to 2011 significantly undershoots the recovery of the top 1% income share following recessions. Therefore, we will use in our benchmark estimates the counterfactual based on the 2009-2011 recovery path.

Panel B of Figure 6 zooms in on the recent period 2002-2015 and illustrates graphically the estimation of the short-term elasticity e_S comparing 2012 and 2013 income shares, and the medium-run elasticity e_M comparing 2011 and 2015 (relative to the counterfactual trend post Great Recession 2009-2011) as we shall discuss in detail in Table 3.

It should be noted that there remains much uncertainty about what the path of top income shares recovery would have been absent the tax increase. In particular, the counterfactual path of recovery of the top 1% income share is slower than in the earlier recessions: although the top 1% income share increased sharply from 2009 to 2010, it actually decreased slightly from 2010 to 2011 (even though 2011 is not affected by the 2013 tax reform). In the previous recessions, the growth in the top 1% income share was smoother and more closely aligned with a straight line extrapolating after the first two years of recovery, as depicted in Figure 6. This implies that there are larger “confidence intervals” around our medium-run estimates (than around our short-run estimates described in the previous section).

Table 3 presents the medium-run elasticity estimates e_M comparing 2011 and 2015. Each of the four columns considers a specific income group: (1) top 1%, (2) top 1-.1% (top 1% excluding the top .1%), (3) top .1%, (4) top .01%. Panel A describes the computations in detail for the elasticity of total income including capital gains with respect to the net-of-tax rate. The elasticity is estimated using equation (2) as the ratio of the log-change in top income shares from 2011 to 2015 (minus the counterfactual change $\Delta \log sh$) to the log-change in net-of-tax rates (from Table 1). The numerator of the elasticity e_M is illustrated in Figure 6, Panel B as the difference in 2015 between the actual top income share and the counterfactual income share. The benchmark estimates of Panel A assume that, absent the tax change, top income shares would have increased at

the same rate as the medium-term post Great Recession increase from 2009 to 2011 (diamond series in Figure 6). Panel B1 repeats the benchmark estimates in the first row and presents two alternative identification assumptions in rows 2 and 3. The second row of Panel B1 assumes that top income shares would have increased as the secular long-term average from 1978 to 2011 (solid circles series in Figure 6). The third row of Panel B1 assumes that top income shares would have stayed constant. Panel B2 repeats Panel B1 but for income excluding realized capital gains (instead of income including capital gains). Three important findings should be noted.

First and most important, our benchmark estimates show uniformly small medium-term elasticities for all income groups (between .1 and .3). For the top 1%, we obtain a medium-term elasticity $e_M=.26$. In other words, top income shares have increased from 2011 to 2015 at an annual rate only very slightly lower than from 2009 to 2011, the first two years of post-Great Recession recovery. In Figure 6, Panel B, in 2015, the counterfactual series in diamonds is only very slightly higher than the actual series in solid black triangles.

Second, Panel B confirms that the estimates are quite sensitive to our identification assumption. If we use the 1978-2011 trend to construct the counterfactual, then the elasticities become negative (-0.44 for the top 1% income group). If we assume a flat top income share path for the counterfactual, the elasticities become large negatives (-1.0 for the top 1% income group). Conversely, if we had chosen a more aggressive path of recovery for the top 1% than the 2009-2011 experience, the estimated elasticity would have been larger. Obtaining a large elasticity (equal to one or above) however would have required a very aggressive path of growth for the top 1%, which is not very realistic in light of the moderate growth path of top income shares from 2009 to 2011. This highlights, however, that our benchmark estimates have large implicit “confidence intervals”. Panel B2 show that we obtain quite similar results when we consider income excluding capital gains. Our benchmark estimates display fairly small elasticities (around .3). These elasticities become negative as well if

we make less aggressive identification assumptions on the path of top 1% incomes.

The existing literature has often used lower income groups as controls to analyze the effects of top tax rates on reported top incomes (see the pioneering studies by Lindsey [1987] and Feldstein [1995]). Figure 2 shows the issue with this approach. For the 2013 reform, the top 5-1% and top 10-5% which are high (but not super high) may a-priori look like good control groups. Indeed, their income shares are hardly affected by the 2013 tax reform and stay almost flat in the medium-term from 2011 to 2015: the top 5-1% share increases very slightly from 16.2% to 16.5% while the top 10-5% share decreases very slightly from 12.2% to 11.9%. Hence, using these groups as controls would amount to assuming that, absent the 2013 tax reform, the top income share for the treatment group (the top 1%) would also have stayed constant. However, as we have just seen, this would produce large negative elasticities. Taking a longer-term perspective, Figure 2 shows that assuming a parallel trend between the top 1% treatment group and the top 5-1% and top 10-5% control groups is not a tenable assumption: The top 1% income share displays a much stronger upward long-term trend than the rest of the top decile. The top 1% income share also falls more during recessions and rebounds more strongly after recessions than the control groups. Hence, it is almost certain that, even absent the 2013 tax reform, the top 1% would have grown faster than the control groups from 2011 to 2015. The bottom line is that using high (but not super high) income groups as controls is not a sound assumption for estimating the behavioral responses of high income taxpayers.

Another approach could be to use variation in tax rates changes within the top 1% to identify tax rate effects. Yet, there are also issues with such an approach.

First, taxpayers subject to the Alternative Minimum Tax (AMT) are less affected by the 2013 tax reform.¹⁹ However, AMT taxpayers within the top 1% are unlikely to be a good control group because they tend to be in the bottom part of the top 1% (see Table 3.1 in US Treasury Department, IRS, Statistics of Income, Publication 1304). We have seen clearly that the tax response is much stronger in the top .1% than in the next .9%. Hence, AMT taxpayers are likely to be less responsive to tax changes than the top 1% as a whole and hence unlikely to be a good control group.

Second, some income components are less affected by the 2013 tax reform than others. For example, S-corporation active profits or pensions are not affected by the Health care surtax. However, as we have seen in Table 2, there is great heterogeneity in elasticities across income groups. Hence, exploiting variation in tax rate changes across income groups is also unlikely to provide compelling identification.

Third, there are many aspects of the tax system that generate local variation in marginal tax rates. For example, the 2013 tax reform reintroduced the phasing-out of exemptions, which increases marginal tax rates in a specific range of income (between \$300,000 and \$425,000 of AGI for married joint filers for example). However, the literature has shown that taxpayers are much less responsive to local and less salient changes in the tax system (such as a phase-out for example) than the much more visible top tax rates.²⁰ This could be due to fixed costs required to respond to tax changes (it is not worth re-optimizing if the stakes are small) or information issues (individuals or their tax accountants

¹⁹ Specifically, AMT taxpayers are equally affected by the Health care surtax. They also face the higher 20% tax rate on realized capital gains and dividends but they do not face the higher 39.6% tax rate on ordinary income. The marginal tax rate of AMT taxpayers is also affected by the phasing-out provisions of the AMT exemptions (which increases the AMT marginal tax rate from 28% to 35% for ordinary income and from 20% to 25% for dividends and realized capital gains).

²⁰ Chetty et al. (2011) show that estimated elasticities around large kink points where the marginal tax rate jumps up using bunching methods are much larger than around small kink points. Saez, Slemrod, Giertz (2012) obtain much smaller elasticities when they use all sources of variation in marginal tax rates (instead of just large tax reforms) in micro-econometric regressions using US panel tax data for years 1991 to 1997 (see their Table 2, p. 24, last two rows).

ignore small aspects of the tax code and concentrate on the main features only). The bottom line is that taxpayers pretty much ignore small changes to focus on the broad features on the tax system. Hence, the elasticity obtained from using local and less salient changes is unlikely to be the relevant one for evaluating the effects of the main features of the 2013 tax change. Note also that for short-term retiming, the precise details of the tax reform were not known before early 2013. As a result, short-term retiming had to be based by necessity only on the expected broad features of the tax change.

Therefore, based on these three main points, it is unlikely that a more micro-approach within the top 1% will yield more convincing estimates than the simpler and transparent approach proposed in this paper. In the conclusion, we will discuss various avenues for further refining the analysis with individual level micro-data.

3.3 Evidence from Charitable Giving

The analysis of charitable giving behavior of top income earners can cast additional useful light on behavioral responses to taxation. The literature has found significant responses of charitable giving to tax rates, especially in the short-run.²¹ Charitable giving responses to taxation have traditionally been studied separately from responses to overall reported income. However, studying them together is fruitful for two main reasons. First, charitable giving is an important part of how the rich use their incomes. Indeed, the fraction of income given to charity increases with income and has reached about 10% of total income at the very top of the income distribution in recent years (see the IRS statistics on the top 400 income earners, U.S Treasury, IRS, 2015). Top 1% income earners have given about 3-4% of their income to charity in recent years. Therefore, charitable giving is potentially a useful proxy for the real economic

²¹ Clotfelter (1985) provides an earlier survey of the literature on charitable giving and taxation. Landais and Fack (2016) provide a more recent survey emphasizing the historical perspective. See Auten, Sieg, and Clotfelter (2002) and Bakija and Heim (2011) for studies exploiting recent US tax reforms.

incomes of top income taxpayers. If incomes at the top increase (for tax unrelated reasons), charitable giving should increase as well. Second, the tax incentives for charitable giving go in the opposite direction of the tax incentives for reporting income. This is because charitable giving can be deducted from income to reduce the amount of tax paid. As a result, giving \$1 to charity saves \$1 times the marginal tax rate (MTR) and hence really costs the taxpayer \$1-MTR. Therefore, the net-of-tax rate \$1-MTR is effectively the price of charitable giving. Hence, if the marginal tax rate on top earners increases, we should see their reported income decrease, but we should also see their charitable giving increase. Therefore, the asymmetry in responses to taxes of charitable giving vs. overall income offers a unique opportunity to disentangle tax-induced changes from non-tax-induced changes.

Figure 7 depicts average charitable giving of top 1% income earners (normalized by average income per family economy wide) in empty diamonds on the left y-axis. It also depicts the top 1% income share on the right y-axis for comparison purposes. The normalization of charitable giving is made so that the two series are directly comparable as the top 1% income share is defined as average income of the top 1% income earners divided by average income per family economy wide. Two interesting broad points can be made.

First, charitable giving of the top 1% and the incomes of the top 1% have followed remarkably parallel paths both in the long-run from 1962 to 2014 and in the short-run around the 2013 tax reform. We will discuss the long-run parallel paths in detail in the next sub-section. Focusing on the period around the 2012 tax reform, we can see that charitable giving of the top 1% falls sharply during the Great recession from 2007 to 2009 and then starts recovering from 2009 to 2011, following almost exactly the same path as the top 1% income share. This short-run parallelism suggests that, absent a tax change, charitable giving of the top 1% is actually a good proxy for the evolution of top 1% incomes. Strikingly and unexpectedly based on prior work, charitable giving also spikes in 2012 and then falls in 2013, again following almost exactly the path of top 1% income. We discussed in great detail above how top 1% income earners retimed their income

from 2013 to 2012. Figure 7 shows that they correspondingly retimed their charitable giving from 2013 to 2012 even though this strategy is tax dominated. They could have saved \$4.6 per \$100 of charitable giving by postponing their charitable giving into 2013 (and benefit from the higher marginal tax rate of 39.6% in 2013 instead of 35% in 2012). This tax avoiding strategy should have been easy to carry out as incomes were already realized (and hence no liquidity or credit constraints issues were present). This implies that charitable giving of top earners was inelastic around the 2013 tax reform in the short-run, in contrast to what was expected based on the earlier literature. Interestingly, the spike in 2012 is hardly visible for the top 1-.1% group and correspondingly more pronounced for the top .1%. This suggests that, for charitable giving, the bottom of the top 1% might be more tax strategic than the very top, in sharp contrast to what we saw for income.

Second and related, Figure 7 shows evidence of tax induced behavioral responses of charitable giving around earlier tax reform episodes (recall that Figure 1 provides the exact evolution of top marginal tax rates). In 1982, the top tax rate on ordinary income went down from 69.1% to 50%. The top 1% income share increases in 1982 (a fact first documented by Lindsey [1987]). However, charitable giving is slightly higher in 1981 and slightly depressed in 1982, suggesting some retiming response. More saliently, charitable giving was substantially higher in 1985 and 1986, the two last years with 50% top marginal tax rates, and is depressed in the following years when the top marginal tax rate drops to 28%. In 1993, the top tax rate increased from 31% to 39.6%. The top 1% income share spikes in 1992 and is depressed in 1993. In contrast, charitable giving is low in 1992 and much higher in 1993. This latter evidence is strikingly at odds with the evidence from the 2013 tax reform. It is also difficult to see any response of charitable giving to the Bush administration 2001 tax cut: charitable giving follows income closely from 2000 to 2007 in spite of the reduction in top tax rates in 2003. Therefore, charitable giving seems to have become less elastic to taxes since 2000 at least in the short-run.

Third, in the medium run, from 2011 to 2014, it does seem that charitable giving of the top 1% grows faster than the incomes of the top 1%: top 1% earners gave 3.3% of their income in 2011 while they gave 3.8% of their income in 2014. This could be evidence of a sizeable charitable giving elasticity in the medium-run. However, for the top 1-.1%, the fraction given in 2011 is 2.74% and almost identical to the fraction given in 2014 which is 2.78%, which would suggest that only charitable giving of the very top is elastic in the medium-run. Alternatively, it could be that charitable giving increases faster than incomes for top earners when top income shares recover from a recession (as was the case from 1995 to 2000). This emphasizes again the difficulty of identifying medium-run elasticities.

3.4 Long-term link of top incomes and top tax rates

What can the 2013 tax reform teach us about the effects of top tax rates on top incomes in the long-run, and the policy trade-offs involved? Obviously, with data available only up to 2015, it is still too early to know. Our main conclusion is that, in the medium-run, top incomes do not appear to be very elastic to tax rates because top income shares have continued to rebound fairly strongly from the Great Recession even after the tax rate increase. This finding is consistent with the earlier findings around the 1993 tax rate increase when top income shares also increased sharply in the second half of the 1990s.

Yet, in earlier work (Piketty, Saez, and Stantcheva [2014]), we have argued that there was a strong negative link between top marginal tax rates and top income shares both in the US historical record since 1913 and in the international data since the 1960s. In the United States since 1913, top income shares and top marginal tax rates are mirror opposite images (Piketty, Saez, Stantcheva [2014], Figure 1A). In the international data, there is a strong correlation between the size of the cuts in top marginal income tax rates and the size of the increase in top 1% income shares from the early 1960s to the late 2000s: Countries that cut their top tax rates a lot (such as the US or the UK) experienced a surge in top 1% incomes shares, while countries which did not cut

their top tax rates much (such as Germany or Spain) did not experience a surge in top 1% income shares (Piketty, Saez, Stantcheva [2014], Figure 3). How can these findings be reconciled with the absence of medium-term responses to the 2013 tax increase?

Some have emphasized that the strong link between top tax rates and pre-tax top income shares reflects mostly tax avoidance rather than changes in the real economic incomes of top earners. Under this tax avoidance scenario, real US top income shares were as high in the 1960s or 1970s as they are today but a smaller fraction of top incomes was reported on tax returns in the 1960s and 1970s than today, as taxpayers had strong incentives to use tax avoidance to escape the very high top tax rates. The evidence shown in Figure 7 with charitable giving casts new interesting light on this issue.

First and most importantly, the figure shows that charitable giving of the top 1% has followed the path of top 1% incomes in the long-run. In the mid-1970s, the top 1% income share was around 9%, which means that top 1% income earners had 9 times the average income per family and top 1% income earners gave to charitable causes on average 33% of the average income per family economy wide. In 2014, the top 1% income share is 21.4% so that top 1% earners now have 21.4 times the average income per family and they gave to charitable causes about 81% of the average income per family economy wide. Hence, the top 1% incomes and their charitable contributions have increased by exactly the same factor 2.4 from the mid-1970s to 2014. Under the tax avoidance scenario however, reported top income shares were low in the 1970s because of tax avoidance but the real top income shares were as high as today. In that case, top 1% income earners would have been able to give a lot to charity. The high tax rates of the 1970s (relative to today) provided further incentives to give so they should have given even more than today.²² This prediction however is completely at odds with the long-run findings in Figure 7. In other words, the rich

²² Charitable giving can be deducted from income only up to 50% of AGI (with stringer limits on non-cash contributions) with carryover up to 5 years. Only a minuscule share of top income earners hit this cap (and this is true for the full period 1962-2015). Hence, limits to charitable deductions cannot explain the findings from Figure 7.

today are able to give a lot more to charity than in the 1970s even though the tax incentive to do so is much weaker. This implies that their true incomes must also have grown a lot.²³ The remarkable long-run parallel trend between charitable giving of the top 1% and the reported incomes of the top 1% strongly suggests that reported incomes accurately reflect the evolution of the economic incomes of the top 1%.²⁴

Second, there are indeed episodes when charitable giving of the top 1% does not follow the same path as the top 1% incomes in the short-term. Interestingly, these episodes are related to tax changes. Most importantly, charitable giving does not grow as much as reported income around the Tax Reform Act of 1986. Figure 7 shows a gap arising between the two curves from the early 1980s until about 1992. As discussed above, it has indeed been noted abundantly in the previous literature that the Tax Reform Act of 1986 created a shift in business profits from the corporate tax base toward the individual tax base (see Slemrod, 1996, Auerbach and Slemrod, 1997, Gordon and Slemrod 2000, Saez, 2004, and the survey by Saez, Slemrod, and Giertz 2012). This surge in business income from 1986 to 1988 is also clearly visible in Figure 4 Panel B described above. The fact that charitable giving does not increase much from 1984 to 1990 while reported top incomes do, is fully consistent with the earlier findings from the literature that income shifting played a large role in the surge of top incomes during the Tax Reform Act episode. However, in the long-run, corporations distribute profits to shareholders in the form of dividends or realized capital gains (when shareholders sell their shares). Hence, a shift from the corporate sector toward the individual sector increases business individual income but also reduces correspondingly dividends and realized capital gains in

²³ Note that if the rich were accumulating income within corporations in the 1960s and the 1970s and had wanted to give part of this income to charity, they could have realized income at any time (by paying out dividends or selling stock) and given the realized income immediately to charity, at zero tax cost. Hence, accumulation within closely held businesses does not prevent charitable giving at the individual level.

²⁴ An alternative explanation is that the rich have become more generous over time, and their increased generosity has moved almost in perfect tandem with their reduced tax avoidance (and hence their reported incomes). If this alternative looks like a stretch, it is probably because it is.

the long-run, and hence might not depress reported top income shares in the long-run. Therefore, the shift in business income due to the Tax Reform Act of 1986 inflates artificially top reported incomes in the short-run but not in the long-run. Consistent with this, Figure 7 shows that charitable giving of the top 1% catches up with reported top incomes in the 1990s.

If the surge in top incomes since the 1970s is real and if the cut in top tax rates played a significant role in this surge, how can we explain that the 2013 top tax rate increase (and the earlier 1993 top tax rate increase) do not seem to have prevented top income shares from growing further? In our view, the most likely explanation is that top tax rates are only one element determining the level of top income shares. Certainly, the comprehensive US and international historical record gathered in the World Top Income Database (Atkinson, Piketty, and Saez, 2011) shows that top income shares cannot stay durably high when the tax system is very progressive (with top tax rates in excess of 60%). However, top income shares can vary widely across countries at lower tax rates. For example, Japan has top tax rates comparable to the US today, yet has top 1% income shares that are only half as high (Moriguchi and Saez [2008]). Therefore, within the range of top marginal tax rates that have existed since 1988 in the United States, i.e., in the range of 28% to 43% (see Figure 1), top incomes do not appear to be very sensitive to top tax rates, except through short-term tax avoidance.²⁵ This implies that increasing top tax rates within this range is an efficient way to raise revenue. And it is obviously desirable if society values a more equal distribution of economic resources. Next, we compute more precisely the revenue consequences of the 2013 tax increase.

3.5. Revenue Effects of the 2013 Tax Increase

²⁵ When top tax rates are very high, top incomes do not seem very responsive to tax rates either. Figures 1 and 3 show that the Kennedy tax cuts of the early 1960s which lowered the top tax rate from 87% to 70%, hereby more than doubling the net-of-tax rate from 13% to 30% at the top, had no noticeable effect on the top income shares.

In this final section, we derive the revenue consequences of the behavioral responses we have uncovered and we relate them to the projected revenue increases of the tax reform absent any behavioral response. This allows us to evaluate the efficiency costs of the tax reform. In the spirit of this paper, we aim at providing simple computations based on the basic data we have used rather than trying to estimate tax rates perfectly incorporating all the aspects of the tax code using tax calculators such as TAXSIM. Hence, our computations should be seen as an illustrative first order approximation capturing the most important aspects of the reform and its behavioral responses.

Revenue loss due to medium-term responses: It is easy to evaluate the efficiency costs of the 2013 tax reform following the framework laid out in Saez (2004) or Saez, Slemrod, and Giertz (2012). Starting from a tax rate τ in the top bracket for incomes above z^* , increasing the top tax rate by $d\tau$ mechanically raises $dM=N[z-z^*]d\tau$ where N is the number of taxpayers in the top bracket and z the average income in the top bracket. With an elasticity e of reported income with respect to the net-of-tax rate, top bracket taxpayers reduce their reported income on average by $dz = -e z d\tau/(1-\tau)$, reducing tax revenue from top bracket taxpayers by $dB=-N \tau dz= -N d\tau e z \tau/(1-\tau)$. Hence, the total effect on tax revenue is $dT=dM+dB$:

$$dT = d\tau N [z-z^* - e z \tau/(1-\tau)] = d\tau N [z-z^*] [1- e a \tau/(1-\tau)], \quad (4)$$

where $a=z/(z-z^*)$ is the Pareto parameter of the income distribution in the top bracket. Hence, equation (4) very simply shows that the fraction of the projected mechanical revenue lost through behavioral responses is $e a \tau/(1-\tau)$. For the 2013 tax change, we have $e=0.26$ (Table 2), $a=1.5$ (based on tax statistics), and $\tau=.32$ (Table 1), so that $e a \tau/(1-\tau)=.19$. In other words, based on our low elasticity estimates, in the medium-run (2014 and after), only 19% of the projected tax revenue is lost through behavioral responses.

Revenue loss due to short-term responses: This calculation however ignored the short-term very large elasticity we have estimated in Table 2. How should the short-term elasticity be incorporated in this computation? The short-term elasticity shifts income just for one year (from 2013 to 2012). The income shifted into 2012 still pays 2012 tax rates so the tax lost in 2013 through behavioral responses are $dB_S = -N d\tau dz_S$ where $d\tau$ is the marginal tax rate difference between 2013 and 2012 and dz_S is the short-term retiming response from 2013 into 2012. Hence, we have $dB_S = -N d\tau dz_S = -N (d\tau)^2 e_S z / (1-\tau)$. Therefore, the fraction of revenue lost through behavioral responses in 2012 and 2013 combined is $e_S a d\tau / (1-\tau)$. With $d\tau = .073$, $\tau = .32$ (Table 1), $e_S = 1.16$ (Table 2), and $a = 1.5$, this is a 19% of the projected tax revenue increase for 2013. Even though the short-term elasticity e_S is 4 times as large as the medium-term elasticity e_M , the revenue loss due to the short-term elasticity in 2013 is about the same as the annual revenue loss in the medium-term because retimed income still pays the 2012 tax rate (which is about $\frac{3}{4}$ of the 2013 rate). This implies that the large short-term elasticity does not fundamentally affect the efficiency costs of the 2013 tax reform.

Our medium-run elasticity estimate $e_M = .26$ implies that the revenue maximizing tax rate would be $\tau^* = 1 / (1 + a e) = 1 / (1 + 1.5 * .26) = 72\%$. However, based on the historical record, a tax rate that high would likely depress top incomes much more than predicted by an elasticity of .26 (with an elasticity of .26, increasing the top tax rate from 32% to 72% would reduce top incomes by only 21%). Therefore, in our view, there is likely a tipping point perhaps between 50% and 60% above which marginal tax rate would have a much stronger negative effect on top incomes. Going above this tipping point is necessary to significantly reduce US pre-tax income concentration. As argued in Piketty, Saez, and Stantcheva (2014), going above such a tipping point is desirable if the pre-tax income lost by the top 1% is due to reduced rent-seeking (and not reduced labor supply) and hence trickles down back to the bottom 99%.²⁶

²⁶ If the income lost by the top 1% is due to conventional supply side responses, nothing trickles down to the bottom 99% and going above the revenue maximizing tax rate is

4. Conclusions and Future Work

This paper has provided preliminary evidence on behavioral responses to taxation around the 2013 tax increase that raised top marginal tax rates on capital income by about 9.5 points and on labor income by about 6.5 points. We have used very simple tabulated tax data routinely produced by the Statistics of Income division of the IRS to carry out our analysis. This has the advantages of forcing us to focus on the big picture, of being simple and transparent, and it illustrates the great public value of tax statistics tabulations to enlighten the tax policy debate.

We have found that reported top 1% incomes were significantly higher in 2012 than in 2013, implying a large short-run elasticity of reported income with respect to the net-of-tax rate in excess of one. This implies that top 1% income earners shifted slightly over 10% of their 2013 incomes into 2012. This large short-run elasticity is due to income retiming for tax avoidance and is particularly high for realized capital gains and dividend income. Although the short-term elasticity is large, the revenue consequences for 2012 and 2013 combined are pretty modest as retimed income was still taxed at 2012 tax rates (which are about $\frac{3}{4}$ of the 2013 tax rates). As a result, slightly less than 20% of the mechanical projected 2013 tax revenue increase due to higher rates is lost when adding back the taxes paid on the extra income reported in 2012.

Comparing 2011 and 2015 incomes generates a small medium-term response to the tax increase as top income shares have resumed their upward trend in 2015. With our preferred estimate for the medium-run elasticity of .26, which is a moderate size elasticity, we calculate that the revenue loss (relative to projected mechanical revenue increase) is only about 20%, making a top tax rate increase an efficient way to raise revenue, even absent any redistributive

never desirable. However, the sense that there is a tipping point for the top marginal tax rate, under which supply side responses are small, is at odds with the conventional supply side response model where responses should be smooth.

concerns, and even if the reduced incomes at the top come from reduced economic activity through standard supply-side responses. It is important to note however that there is a larger confidence interval around our medium-run elasticity estimate due to uncertainty about the correct counterfactual for top income shares had the 2013 tax reform not happened. More broadly, it is striking to note that the best growth years for the bottom 99% incomes since 1990 have taken place in the mid to late 1990s and since 2013, shortly after increases in top tax rates (Saez, 2008). Hence, the top tax rate increases of 1993 and 2013 do not seem to have hurt overall economic growth, quite the contrary.

While simple tabulated data have allowed us to obtain some valuable preliminary results, we want to discuss briefly in this conclusion how the use of micro-level data could help further refine the analysis.

First, we do not think that the standard panel methodologies pioneered by Feldstein (1995) and Gruber and Saez (2002) are useful to estimate the effects of the 2013 tax increase. The panel methodology groups taxpayers by income size before the reform (for example 2011) and compares income outcomes of each group after the reform (for example 2014). In the case of the 2013 tax reform, the treatment group is naturally the top 1% and the control group could be the next 9%. Because of income mobility, individuals in the top 1% in 2011 will not all be in the top 1% in 2014, so that their income rank can only fall. Hence, their incomes will likely fall (relative to the control group whose relative ranks can go up) leading to an upward bias in the elasticity estimation.²⁷ Recently, Kawano, Weber, and Whitten (2016) have analyzed the 2013 tax reform using tax data and a panel methodology. Building upon Weber (2014), they develop a sophisticated methodology to control for the mean reversion issue we discussed. They obtain very small medium-run elasticity estimates, a result consistent with our finding of small medium-run elasticity using our much simpler top income share method.

²⁷ Kleven and Schultz (2014) is the most compelling taxable income elasticity study using panel techniques. The study is compelling because it can analyze large tax changes which are not concentrated solely at the top of the distribution, so that comparable control groups can be constructed.

Second however, longitudinal micro-data would allow a more direct test of the retiming hypothesis. Do we see indeed that it is those taxpayers who report abnormally high incomes in 2012, who then report abnormally low incomes in 2013? Using panel tax return data would allow us to zoom in on the group of taxpayers who respond to tax avoidance through retiming, and understand more deeply which taxpayers can retime their income.

Third, more granular analysis would help understand better the mechanisms behind retiming. For capital income, it is possible that realized capital gains and dividend retiming is due to corporate decisions (from private equity for example) rather than individual shareholders decisions. For wage income, W2 wage earnings information reports have specific information on exercised stock options (since 2003), which would allow to analyze their importance in the overall wage response we have documented. For business income and using panel data, Auten, Splinter, and Nelson (2016), show that the 2013 tax reform induced a shift from *passive* S-corporation profits (which are taxed as investment income by the Health care surtax) toward *active* S-corporation profits, which escape the Health care surtax, which is a significant loophole in the Health care tax law. Their result emphasizes the value of using micro-data to analyze more finely the 2013 tax reform.²⁸

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²⁸ There is no information on passive vs. active S-corporation profits in the standard Statistics of Income tabulations. Auten, Splinter, and Nelson (2016) also estimate short-term elasticities following our simple top income share methodology. However, they compute marginal tax rates much more precisely than we have done here using the comprehensive Joint Committee on Taxation tax calculator. Like us, they find large short-run elasticity estimates.

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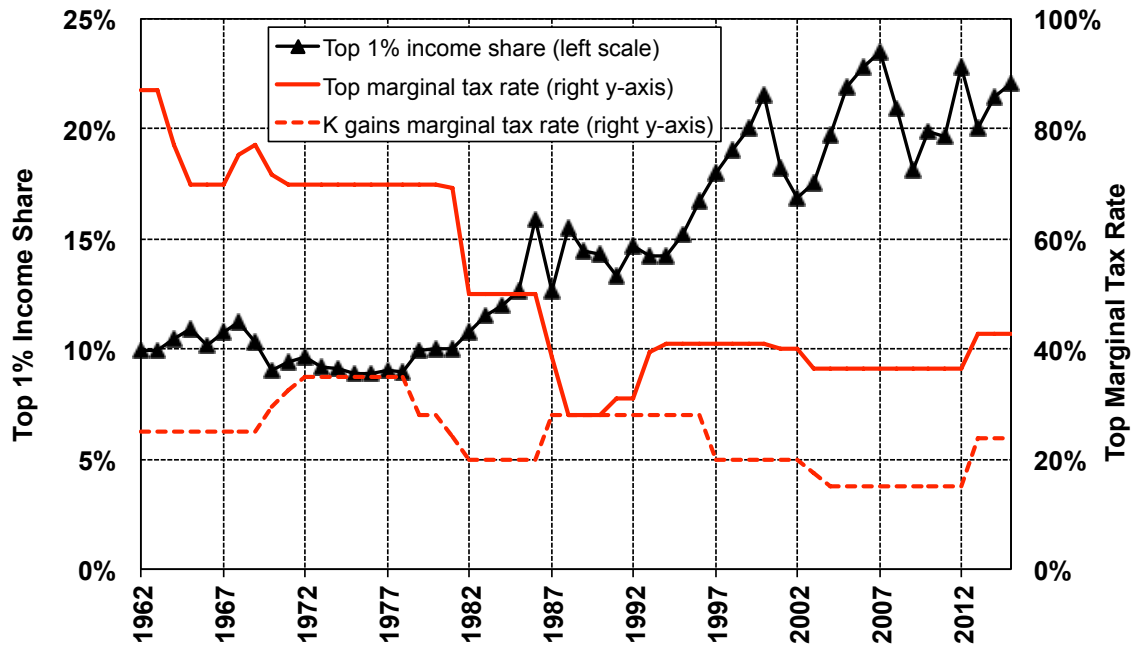


Fig. 1. Top 1% Pre-Tax Income Share and Top Tax Rates

Notes: The figure depicts the share of income earned by the top 1% of families (solid triangle series on the left y-axis scale) from 1962 to 2015. Income is pre-tax gross market income reported on tax returns including realized capital gains (and excluding government transfers such as Social Security benefits and unemployment insurance). The figure also depicts on the right y-axis scale the top marginal tax rate for the Federal individual income tax for ordinary income (in solid line) and for long-term realized capital gains (in dashed line). The ordinary income tax rate includes the uncapped payroll tax rate and the ACA 2013 surtax (prorated based on the fraction of labor income in top 1% ordinary income). The source for the top 1% income share is Piketty and Saez (2003), series updated to 2015. The source for the marginal tax rates is the Tax Policy Center, Historical Individual Income Tax Parameters.

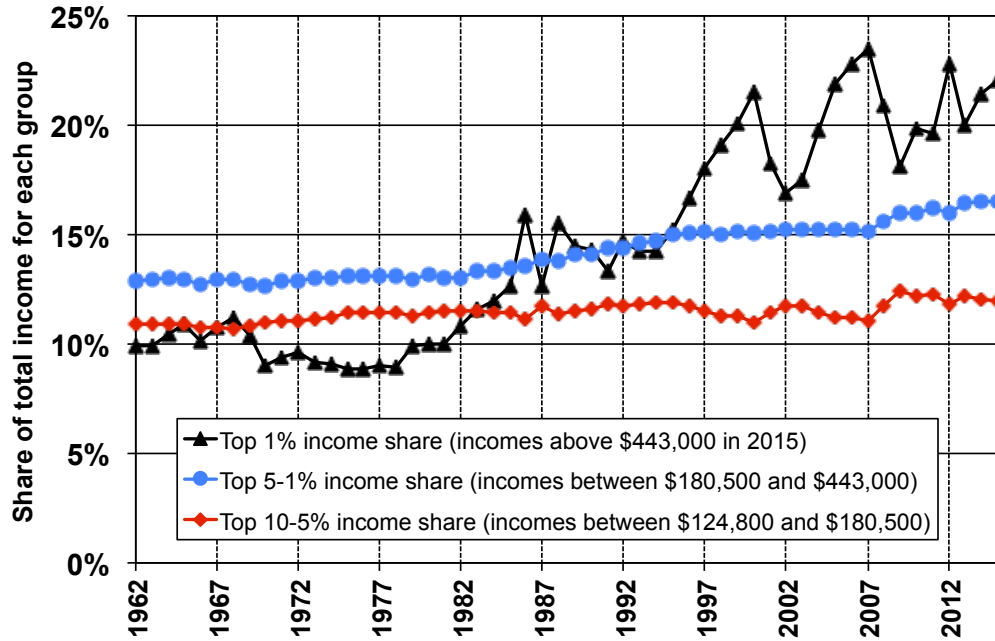


Fig. 2. Top 1%, Next 4%, and Next 5% Pre-Tax Income Shares

Notes: The figure depicts the share of income earned by the top 1% of families (in solid black triangles), the next 4% (top 5-1% in solid circles), and the next 5% (top 10-5% in solid diamonds) from 1962 to 2015. Income is pre-tax gross market income reported on tax returns including realized capital gains (and excluding government transfers such as Social Security benefits and unemployment insurance). The source for the top income shares is Piketty and Saez (2003), series updated to 2015.

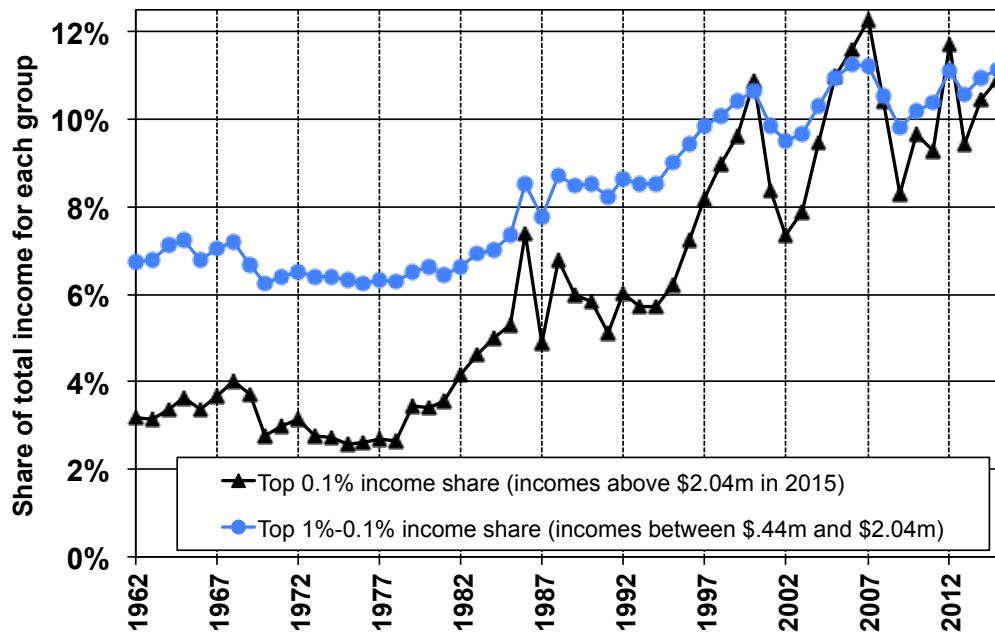
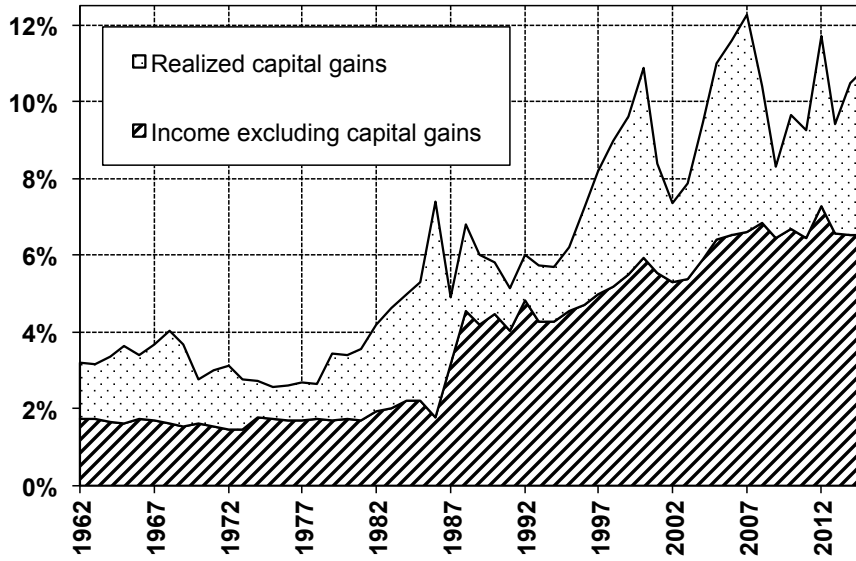


Fig. 3. Top 0.1% and the Next 0.9% Pre-Tax Income Shares

Notes: The figure depicts the share of income earned by the top 0.1% of families (in solid black triangles), and the next 0.9% (top 1-.1% in solid circles) from 1962 to 2015. Income is pre-tax gross market income reported on tax returns including realized capital gains (and excluding government transfers such as Social Security benefits and unemployment insurance). The source for the top income shares is Piketty and Saez (2003), series updated to 2015.

A. Realized capital gains vs. ordinary income



B. Decomposition of income excluding realized capital gains

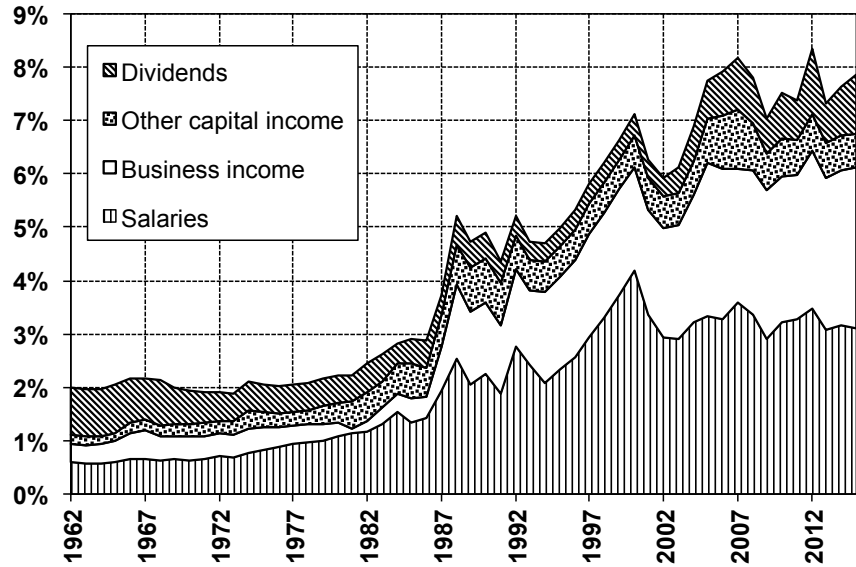


Fig. 4. Top 0.1% Pre-Tax Income Share and Composition

Notes: The figure depicts the share of income earned by the top 0.1% of families and its decomposition. Panel A considers income including realized capital gains and decomposes it into (a) income excluding realized capital gains, (b) realized capital gains. Panel B considers income excluding realized capital gains and decomposes it into (a) salaries (includes all wages and salaries and pensions), (b) business income (includes profits from sole proprietorships, partnerships, and S-corporations), (c) capital income excluding dividends (includes interest, rents and royalties, and estate and trust income), (d) dividends. The source for the top income shares and composition is Piketty and Saez (2003), series updated to 2015.

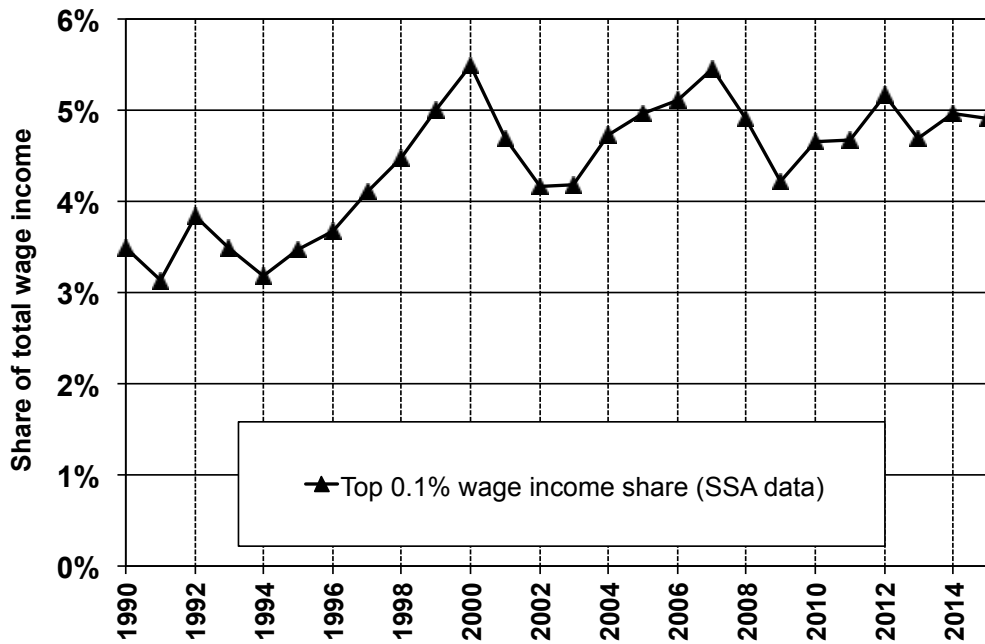


Fig. 5. Top 0.1% Wage Income Share

Notes: The figure depicts the share of wage income earned by the top 0.1% individuals (ranked by wage income) since 1990. This table is based on SSA tabulations of annual individual wage earnings available online. The top 0.1% is relative to the total potential population of employees defined as 85% of the full US population aged 20-64. We choose a fixed fraction of the working age population to incorporate the effects of fluctuations in employment in our wage income concentration series. In year 2000, when the unemployment rate is slightly below 4%, the ratio of the employed population (full-time plus part-time employees in National Accounts series) to the population 20-64 reaches its highest level at 82.4%. Hence, 85% of the population aged 20-64 can be seen as a reasonable benchmark for the maximum potential population of employees. Wage income is defined as W2 wage income (wages, salaries, and tips) inclusive of elective retirement contributions (such as 401(k) contributions). Wage income also includes bonuses, and profits from exercised stock-options. The source for the top wage income shares is Piketty and Saez (2003), excel appendix Table B5, series updated to 2015.

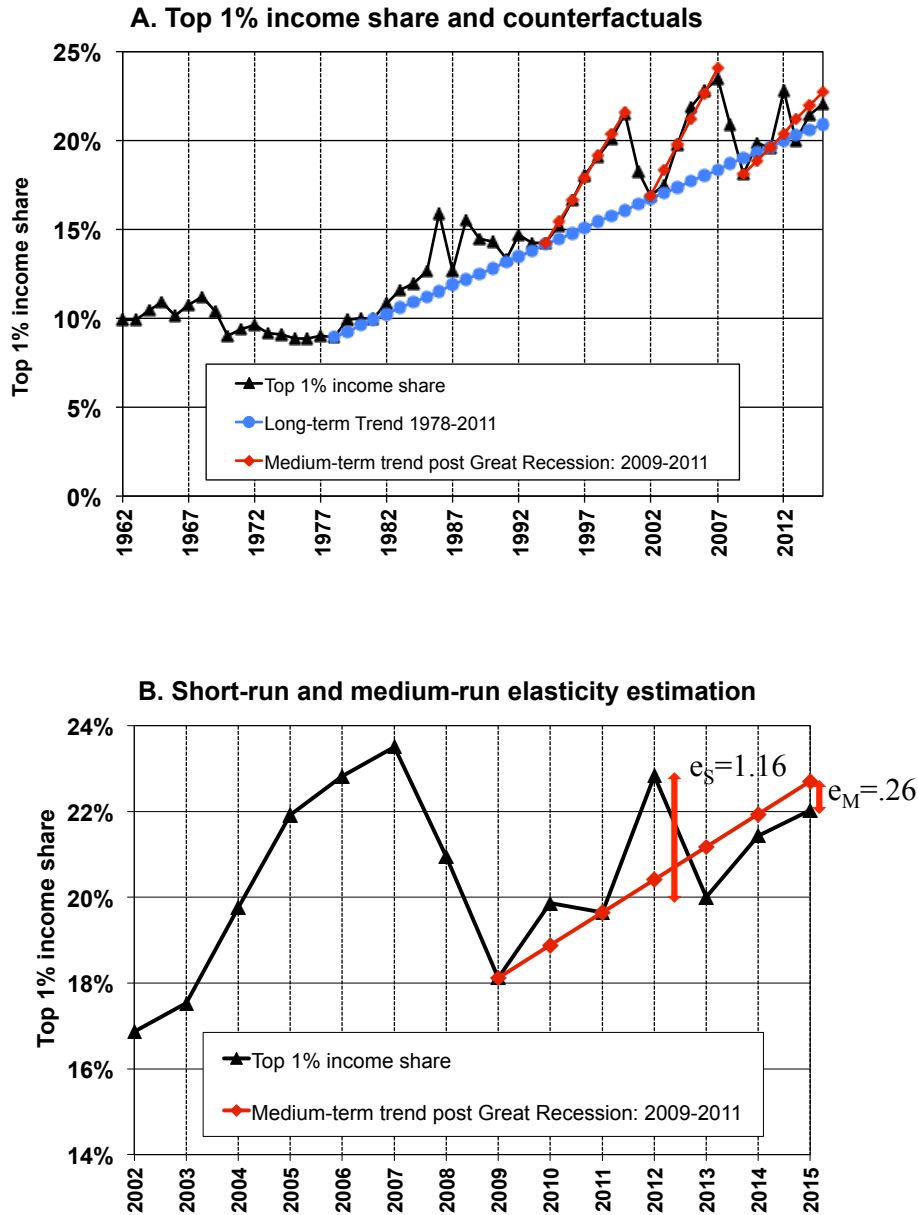


Fig. 6. Counterfactual Top 1% Income Share and Elasticity Estimation

Notes: Panel A depicts the top 1% income share in black triangles and two counterfactual trends for the top 1% income shares that are used in the estimation of the behavioral elasticity of income with respect to the net-of-tax rate. First, the figure depicts (in circles) the long-run straight-line upward trend from 1978 to 2011. Second, the figure depicts (in diamonds) the medium-run straight-line upward trend extrapolating linearly from the 2009 to 2011 recovery after the Great Recession. To test the validity of the post Great Recession medium-term trend, the figure also plots the same straight line extrapolation using the first 2 years of recovery of the top 1% income share after the 1992 and 2001 recessions. Panel B zooms in on the recent period 2002-2015 and illustrates graphically the estimation of (a) the short-term elasticity e_s comparing 2012 and 2013 income shares, (b) the medium-run elasticity e_M comparing 2011 and 2015 (relative to the counterfactual trend post Great Recession 2009-2011).

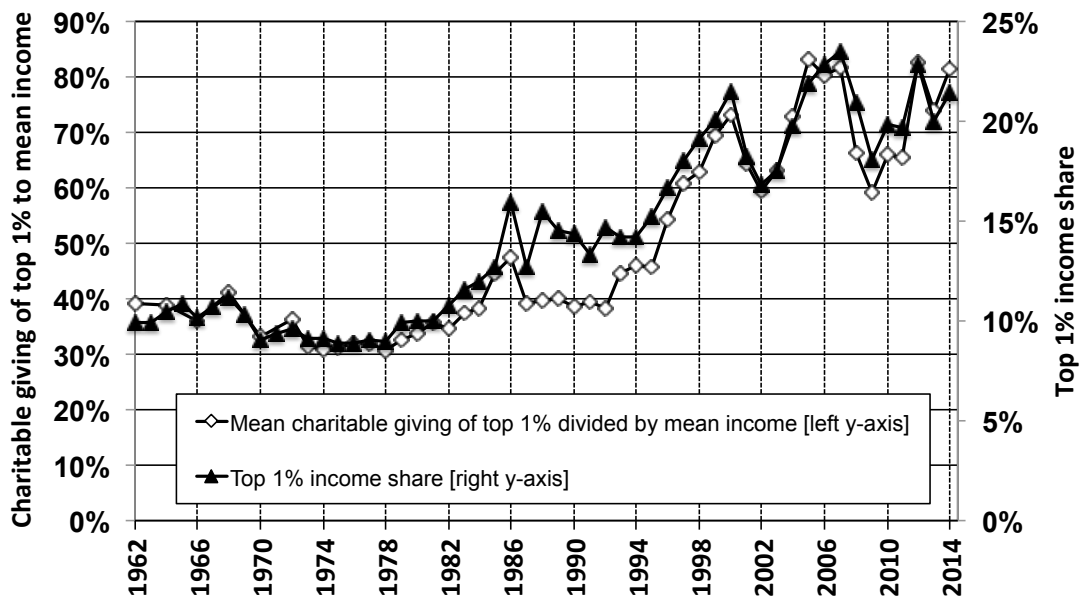


Fig. 7. Charitable Giving of the Top 1%

Notes: The figure depicts average charitable giving of top 1% income earners (normalized by average income per family economy wide) in empty diamonds on the left y-axis from 1962 to 2014. For comparison, the figure depicts top 1% income share in black triangles on the right y-axis. The normalization using average income per family for the charitable giving series is made so that the two series depicted are directly comparable [the top 1% income share is defined as average income of the top 1% divided by average income per family economy wide].

Table 1**Effect of the 2013 Reform on Top Federal Marginal Tax Rates**

	Top federal marginal tax rates			Income thresholds		
	Pre-reform	Post-reform	Increase	Married	Heads	Singles
A. Health Care Tax				Labor income		
Labor income (wages and self-employment)	2.9%	3.8%	0.9%	\$250,000	\$200,000	\$200,000
				Modified Adjusted Gross Income		
Investment income	0.0%	3.8%	3.8%	\$250,000	\$200,000	\$200,000
Other income (includes S-corporation active profits, pensions, and other forms of income)	0.0%	0.0%	0.0%			
B. Individual Income Tax				Taxable Income (about 80% of AGI)		
Top income tax bracket:						
Ordinary income	35.0%	39.6%	4.6%	\$450,000	\$425,000	\$400,000
Long-term realized capital gains and dividends	15.0%	20.0%	5.0%	\$450,000	\$425,000	\$400,000
Limitation on itemized deductions:				Adjusted Gross Income (AGI)		
All income forms	0.0%	1.2%	1.2%	\$300,000	\$275,000	\$250,000
C. Total Effect on Top Federal Marginal Tax Rates by Specific Income Components						
Labor income (wages and self-employment)	37.4%	43.8%	6.7%			
Realized capital gains and dividends	15.0%	25.0%	10.0%			
Other investment income	35.0%	44.6%	9.6%			
S-corporation active profits, pensions, other income	35.0%	40.8%	5.8%			
Charitable giving (subsidy rate)	35.0%	39.6%	4.6%			
D. Total Effect on Federal Marginal Tax Rates by Income Groups						
<u>D1. Total income including realized capital gains (prorating based on income composition)</u>						
Top 1% average marginal tax rate	32.2%	39.5%	7.3%			
Top 1-.1% average marginal tax rate	34.8%	41.6%	6.9%			
Top .1% average marginal tax rate	29.3%	37.1%	7.8%			
Top .01% average marginal tax rate	26.5%	34.9%	8.4%			
<u>D2. Total income excluding realized capital gains (prorating based on income composition)</u>						
Top 1% average marginal tax rate	35.4%	42.2%	6.7%			
Top 1-.1% average marginal tax rate	36.1%	42.7%	6.6%			
Top .1% average marginal tax rate	34.5%	41.4%	6.9%			
Top .01% average marginal tax rate	33.3%	40.5%	7.2%			

Notes: this table presents the impact of the 2013 tax reform on top federal marginal tax rates (including the individual income tax and uncapped FICA payroll taxes). The first three columns present the pre-reform marginal tax rates, the post-reform marginal tax rates, and the change pre to post-reform, respectively. The next three columns show the income thresholds at which the tax changes apply for married joint filers, heads of households, and singles, respectively. Panel A presents the health care tax (including the uncapped portion of FICA payroll taxes on earnings). The extra health care tax of .9% on labor income (wage and self-employment earnings) applies above the stated thresholds for labor income. The extra health care tax of 3.8% on investment income applies when total gross income (formally defined as Modified Adjusted Gross Income) is above the stated thresholds. Panel B presents the individual income tax including the change in the top bracket tax rate and the limitation on itemized deductions (this limitation applies to over 90% of top 1% income earners so we assume that it applies systematically in our tax rate computations). Ordinary income includes all forms of taxable income other than qualified dividends and long-term realized capital gains which are taxed at lower rates (as shown in the table). Panel C shows the total effect of the 2013 tax reform on top federal marginal tax rates for each specific income component. Panel D presents the effects of the tax reform on the average marginal tax rate for the top 1%, top .1%, and top 1-.1% income groups for income including capital gains (Panel D1) and income excluding capital gains (Panel D2). In panels D1 and D2, the average is taken using the income composition of the top income groups in 2011 using the top tax rates by income components from Panel C and ignoring other tax provisions such as the Alternative Minimum Tax or the phase-out of personal exemptions.

Table 2**Estimates for the Short-run Elasticity e_s Comparing 2012 and 2013 Top Income Shares**

	Top income groups			
	Top 1%	Top 1-.1%	Top .1%	Top .01%
A. Elasticity Computation				
Top income share in 2012	22.8%	11.1%	11.7%	5.8%
Top income share in 2013	20.0%	10.6%	9.4%	4.5%
Log change in top income shares from 2012 to 2013 (a)	-13.2%	-5.0%	-21.7%	-26.3%
Net-of-tax rate in 2012	67.8%	65.2%	70.7%	73.5%
Net-of-tax rate in 2013	60.5%	58.4%	62.9%	65.1%
Log change in top net-of-tax rate from 2012 to 2013 (b)	-11.4%	-11.1%	-11.8%	-12.1%
Elasticity of income with respect to net-of-tax rate (a)/(b)	1.16	0.45	1.84	2.18
B. Elasticities under Alternative Identification Assumptions on Evolution of Top Income Shares Absent Reform				
Same as long-term trend increase from 1978-2011	1.30	0.56	2.02	2.38
Same as medium-term recovery trend 2009-2011	1.49	0.69	2.28	2.58
C. Elasticities for Each Income Component				
Total income including realized capital gains	1.16	0.45	1.84	2.18
Realized capital gains	3.16	1.96	3.53	3.49
Income excluding realized capital gains	0.73	0.37	1.19	1.45
Wages, Salaries, and Pensions	0.44	0.13	1.09	1.34
Memo: wages and salaries (SSA data)	0.43	0.17	0.88	1.28
Business income	0.55	0.71	0.41	0.35
Dividends	3.19	1.46	4.01	4.30
Interest, rents, royalties, and estate and trust	0.42	0.54	0.34	0.28
D. Elasticities around Earlier Tax Reforms				
Realized capital gains in 1986 vs. 1987	10.54	9.59	11.16	11.01
Income excluding realized capital gains in 1992 vs. 1993	0.38	0.15	0.75	1.12
Wages and salaries in 1992 vs. 1993	0.32	-0.03	1.05	2.01

Notes: This table presents the short-run elasticity estimates e_s comparing 2012 and 2013. Each of the four columns considers a specific income group: (1) top 1%, (2) top 1-.1% (top 1% excluding the top .1%), (3) top .1%, (4) top .01%. Panel A describes the computations in detail for the elasticity of total income including capital gains with respect to the net-of-tax rate. The elasticity is estimated as the ratio of the log-change in top income shares from 2012 to 2013 to the log-change in net-of-tax rates (from Table 1). The benchmark estimates in Panel A assume no change in top income shares absent the tax reform. Panel B presents two alternative identification assumptions. The first row of Panel B assumes that top income shares would have increased as the secular long-term average from 1978 to 2011. The second row of Panel B assumes that top income shares would have increased as the medium-term post Great Recession increase from 2009 to 2011. In Panel C, we compute elasticity estimates for specific income components. The first row repeats the elasticity estimate for total income with capital gains from Panel A. The second and third rows split total income into realized capital gains and income excluding realized capital gains. The next rows split income excluding realized capital gains into: wages and salaries, business income, dividend income, and other capital income (interest, rents, royalties, and estate and trust income). As a robustness check, the elasticity for wage earnings is also computed using Social Security Administration (SSA) data by size of wage earnings. Panel D computes elasticities around earlier reforms. The first row considers realized capital gains around the Tax Reform Act of 1986 which increased the capital gains tax rate from 20% to 28%. The remaining rows consider the 1993 top tax rate increase from 31% to 39.6%, and report elasticities for income excluding capital gains and wage earnings.

Table 3Estimates for the Medium-run Elasticity e_M Comparing 2011 and 2015 Top Income Shares

	Top Income Groups			
	Top 1%	Top 1-.1%	Top .1%	Top .01%
A. Elasticity Computation				
Top income share in 2011	19.6%	10.4%	9.3%	4.3%
Top income share in 2015	22.0%	11.1%	10.9%	5.1%
Actual log change in top income share from 2011 to 2015 (a)	11.4%	7.0%	16.2%	16.7%
Counterfactual log change in income share (absent reform) (c)	14.5%	10.2%	19.0%	18.1%
Net-of-tax rate in 2011	67.8%	65.2%	70.7%	73.5%
Net-of-tax rate in 2015	60.5%	58.4%	62.9%	65.1%
Log change in top net-of-tax rate from 2011 to 2015 (b)	-11.4%	-11.1%	-11.8%	-12.1%
Elasticity of income with respect to net-of-tax rate [(a)-(c)]/(b)	0.26	0.29	0.24	0.12
B. Elasticities under Alternative Identification Assumptions on Evolution of Top Income Shares from 2011 to 2015				
<i>B1. Income including realized capital gains</i>				
Benchmark: Same as medium-term recovery trend 2009-2011	0.26	0.29	0.24	0.12
Same as long-term trend increase from 1978-2011	-0.44	-0.21	-0.67	-0.61
Constant top income shares after 2011	-1.00	-0.63	-1.38	-1.38
<i>B2. Income excluding realized capital gains</i>				
Benchmark: Same as medium-term recovery trend 2009-2011	0.32	0.39	0.22	0.13
Same as long-term trend increase from 1978-2011	0.11	0.06	0.18	0.46
Constant top income shares after 2011	-0.47	-0.39	-0.57	-0.37
D. Alternative Medium Term Elasticities Comparing 2011 to 2014 (instead of 2015)				
Elasticity of income including realized capital gains	0.21	0.21	0.20	-0.11
Elasticity of income excluding realized capital gains	0.33	0.34	0.31	0.28

Notes: This table presents the medium-run elasticity estimates e_M comparing 2011 and 2015. Each of the four columns considers a specific income group: (1) top 1%, (2) top 1-.1% (top 1% excluding the top .1%), (3) top .1%, (4) top .01%. Panel A describes the computations in detail for the elasticity of total income including capital gains with respect to the net-of-tax rate. The elasticity is estimated as the ratio of the log-change in top income shares from 2011 to 2015 (relative to the counterfactual change absent the reform) to the log-change in net-of-tax rates (from Table 1). The benchmark estimates of Panel A assume that, absent the tax change, top income shares would have increased at the same rate as the medium-term post Great Recession increase from 2009 to 2011 (see Figure 5). Panel B1 repeats the benchmark estimates in the first row and presents two alternative identification assumptions in rows 2 and 3. The second row of Panel B1 assumes that top income shares would have increased as the secular long-term average from 1978 to 2011 (see Figure 5). The third row of Panel B1 assumes that top income shares would have stayed constant. Panel B2 repeats Panel B1 but for income excluding realized capital gains (instead of income including capital gains). Panel D presents alternative elasticity estimates comparing years 2011 and 2014 (instead of 2015) and assuming as in our benchmark that top income shares would have increased at the same rate as the medium-term post Great Recession increase from 2009 to 2011.