Econ 230B
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Emmanuel Saez
Gabriel Zucman
GSI Nina Roussille, nina_roussille@berkeley.edu

Problem Set 2 Solution

1. CEO Pay response to the 2013 US tax increase

The goal of this exercise is to repeat the Goolsbee (2000) analysis of CEO pay around the 2013 top tax rate increase (instead of the 1993 top tax rate increase as Goolsbee did).

a) First stage: Using online sources, calculate the change in the top marginal tax rate for labor income compensation generated by the 2013 tax increase including both the change in the Federal tax rate, and the Affordable Care Act surtax. How does the size of the change compare with the 1993 tax increase from Goolsbee (2000) study?

The official IRS tables show an increase of 4.6% at the top marginal tax bracket for both married joint files and single filers, from 35% to 39.6%.[1] In addition, the Affordable Care Act increased the tax rate by 0.9% for the top bracket, see the link

This changes are substantial, but smaller then those in Goolsbee (2000). Goolsbee analysed an 8.6% increase in the marginal tax (from 31% to 39.6%) for the top bracket, above $250K, and an increase from 31% to 36% for incomes between $140K-$250K. In addition, he studies a removal of the medicare cap, an extra 2.8%.

b) Timing of the reform: search online to figure out whether people knew in advance that the 2013 tax increase would take place? Is it reasonable to think that executives could respond to the tax change as they did with the 1993 tax change?

It is clear that individuals knew, and could respond. Indeed, the bill was introduced in July 2012 and only enacted in January 2013. By comparison, the 1993 reform applied retroactively: it was introduced in May 1993, implemented in August and applied to taxable years beginning after 1992. In addition, fiscal policy was the highest profile issue of the 2012 election: Obama's victory was therefore almost a guarantee that any budget compromise would involve tax increases on top earners.

c) Expected behavioral responses: Based on what we have learned in class about behavioral responses and your response in question b), through what channel do you expect CEOs to respond in the short and the medium-run to the 2013 tax change?

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[1] See the links here for the 2012 and 2013 federal tax tables: federal tax rates 2012 link, federal tax rates 2016 link.

The CEOS could:

1. in the short run: change the timing of realization (e.g., stock options realized in 2012 rather than 2013, accelerating deferred compensation).

2. in the longer run: decrease taxable income (either by lowering their efforts or by doing sophisticated tax planning that involves income shifting or by outright evasion)

d) Empirical analysis using CEO pay: use the execucomp data extract posted online (link here) to create a table similar to table 2 in Goolsbee for years 2011 to 2014. From this table, is there evidence of a behavioral response? What components of CEO pay seem to respond the most? Using numbers from this table and the answer to question a), how large is the elasticity of compensation with respect to the net-of-tax rate in the short-run (2012 vs. 2013) and in the medium-run (2011 vs. 2014)? [no standard error required]

The Table below shows the results. The table shows no evidence of top salary responding to the expected tax change but there is a spike in the value of stock options exercised around the reform.

Table 1: Execucomp data analysis: All CEOs with $> 400K$ in taxable income

year	taxable income	salary	bonus	Option exercised	non-equity inc	stock	option	Other
2010	3964	802.6	247.6	1714	1199	1986	1135	164.4
2011	4349	840.9	226.9	2036	1246	2270	1139	170.3
2012	5568	869.8	218.4	3209	1272	2427	977.7	216.1
2013	5840	899.3	211.0	3371	1359	2648	1065	222.0
2014	6774	918.1	209.8	4200	1446	3010	1101	274.0

We can then focus on option exercised. Let s_t be the share of option exercised in total compensation:

$$e = \frac{lns_t - lns_{t-1}}{ln(1 - MTR_t) - ln(1 - MTR_{t-1})}$$

The SR elasticity of value option exercised is -0.42, the long run one is -5.16. One could also estimate the elasticity in first difference to eliminate the time trend

2. Mobility of High Income US Taxpayers across States

The goal of this exercise is to estimate the mobility of high income US taxpayers across US states due to variation in state income top tax rates across states and over time. High income US taxpayers are defined as tax filers reporting Adjusted Gross Income (AGI) above $1m.

a) Find online information on the state top income tax rates across all states for **2017** incomes. List the five states with the highest top tax rates (group T) and the five states with the lowest top rates (group C) along with the top tax rates in those 10 states. (NOTE: do not exclude zero tax states, if you have ties, keep the largest states in terms of population to have exactly ten states in each group).

The first column of Table 2 does this:

Table 2: Tax rates

Rank	State	Top rate (2017, %)	State	Top rate (2001, %)	Top Rate (2017, %)	Change (pp)
			2017 Rankings	2017-2001 Rankings		
			Treatment (Group T)			
1	California	12.30	California	9.30	13.30	4
2	Oregon	9.90	New Jersey	6.37	8.97	2.6
3	Minnesota	9.85	Connecticut	4.50	6.99	2.49
4	Iowa	8.98	Minnesota	7.85	9.85	2
5	New Jersey	8.97	New York	6.85	8.82	1.97
	Average	10.00	Average	6.97	9.39	2.41
			Control (Group C)			
47	Texas	0.00	Utah	7.00	5.00	-2
48	Florida	0.00	North Carolina	7.75	5.50	-2.251
49	Washington	0.00	New Mexico	8.20	4.90	-3.3
50	Tennessee	0.00	Montana	11.00	6.90	-4.1
51	Nevada	0.00	North Dakota	12.00	2.90	-9.1
	Average	0.00	Average	9.19	5.04	-4.15

b) Use IRS state level data in excel format for tax year 2017 at (link here) to compare the fraction of high income earners in states in group C and states in group T. Fraction high earners is defined as the ratio of number of tax returns with AGI above $1m to all tax returns in group.

Under what assumption does this comparison identify the effects of state income tax rates on mobility? Is this assumption realistic (how could it be tested)?

If this assumption holds, what is the elasticity of the number of high earners with respect to the net-of-tax rate at the state level?

	2017 Rankings		2017-2001 Rankings			
Rank	State	Fraction high earners (%)	State	Fraction high earners (2001, %)	Fraction high earners (2017, %)	Change (pp)
			Treatment (Group T)			
1	California	0.23	California	0.20	0.23	0.02
2	Oregon	0.11	New Jersey	0.26	0.24	-0.02
3	Minnesota	0.14	Connecticut	0.41	0.33	-0.08
4	Iowa	0.08	Minnesota	0.13	0.14	0.01
5	New Jersey	0.24	New York	0.30	0.28	-0.03
	Average	0.16	Average	0.26	0.24	-0.02
			Control (Group C)			
47	Texas	0.18	Utah	0.08	0.13	0.04
48	Florida	0.21	North Carolina	0.08	0.11	0.02
49	Washington	0.18	New Mexico	0.09	0.06	-0.03
50	Tennessee	0.11	Montana	0.05	0.08	0.04
51	Nevada	0.16	North Dakota	0.04	0.11	0.06
	Average	0.17	Average	0.07	0.10	0.03

See Column 1 in Table 3 :

Assumption: Exogenous state tax rates. Unlikely to be realistic

If the assumption holds then the elasticity is equal to $e = \frac{dh}{d(1-\tau)}\frac{1-\tau}{h} = \frac{\frac{0.17-0.16}{0.17}}{\frac{100-90}{100}} = 0.59$, with h being the share of high earners by state and τ is the top marginal tax rate.

c) Find online information on the state top income tax rates across all states for **2001** incomes. Find the five states which had the largest increases in top tax rates (group T) and the five states which had the largest decreases in top tax rates (group C) from 2001 to 2017. List group C, group T, the 2001 and 2017 top tax rates in those states, and the change in top tax rates in those states.

See the second to fourth column in Table 2.

d) Use IRS state level data in excel format for tax years 2001 and 2017 at (link here) to compare the changes in the fraction of high income earners in states in group T and states in group C from 2000 to 2016. Fraction high earners is again defined as the ratio of tax returns with AGI above \$1m to all tax returns.

Under what assumption does this comparison identifies the effects of state income tax rates on mobility? Is this assumption realistic (how could you test it)?

If this assumption holds, what is the elasticity of the number of high earners with respect to the net-of-tax rate at the state level?

See the second to fourth column in Table 3 :

Assumption: parallel trend assumption.

Elasticity is given by:

$$e = \frac{(\log h_{2017}^T - \log h_{2017}^C) - (\log h_{2001}^T - \log h_{2001}^C)}{(log(1 - \tau_{2017}^T) - (log(1 - \tau_{2017}^C)) - (log(1 - \tau_{2001}^T) - (log(1 - \tau_{2001}^C))}$$

$$e = \frac{(log(0.24) - log(0.10)) - (log(0.26) - log(0.07))}{(log(1 - 9.39\%) - (log(1 - 5.04\%)) - (log(1 - 6.97\%) - (log(1 - 9.19\%))}$$

$$e = 6.15$$

e) Let us use the California tax increase at the top of 2012 to identify the effects of top tax rates. Plot the number of fraction of tax filers with \$1m+ AGI in California (treatment group) and Texas (control group) from 2010 to 2017. Estimate the DD effect using 2010-2011 as the control years and 2012-2017 as the treatment years. Does this DD estimate pass the parallel trend assumption? How could you construct a more convincing control group using information available from all the other states?

Figure 1: DiD
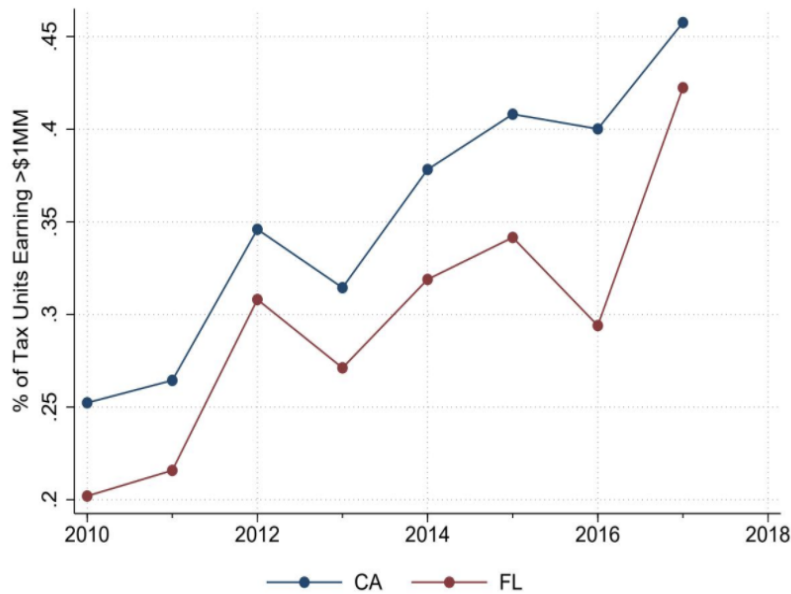
The estimated elasticity using the formula above plugging CA and TX 2016 and 2000 data is approximately -1.3.

Parallel trend assumption is likely not to hold. We could try to re-weight the two groups.

3. Tax Cuts and Job Act

The Tax Cut and Jobs Act (TCJA) passed on December 2017 eliminates the ability of public corporations to deduct compensation in excess of $1 million for each affected employee. As a result, for these executives pay is not just subject to the top federal individual income tax rate (37%), it's now subject to the corporate tax (21%) as well. The tax applies to a maximum of 5 employees per firm.

a) Assuming that the incidence of the tax is fully on executives, what's the combined top marginal income tax rate for an executive living in California (top marginal income tax rate of 13.3%) and affected by the reform? What was the marginal tax rate in 2017, the year before the reform. What is the percent change in the net-of-tax rate? [ignore payroll taxes and the Affordable Care Act surtax here].

Before TCJA, if the firm devotes $1 extra dollar to the pay of the executive, the tax was $.133 + .396 \cdot (1 - .133) = 47.6\%$ (as CA income taxes were deductible from the Federal income tax).

After TCJA, if the firm devotes $1 extra dollar to the pay of the executive, after-corporate tax, there is $.79 extra pay for the executive who them pays extra income tax of 37% + 13.3%=50.3% (as CA taxes are no longer deductible for the Federal income tax above a small cap of $10K that binds for highly paid executives). Hence, the net received is $.397. Hence the marginal tax rate is 60.3%.

Note that we ignore here the extra uncapped payroll tax of 2.9% and the ACA surtax of .9%.

The net of tax percent change is 24%.

b) Assuming the tax cannot be avoided, explain what type of behavioral responses one can expect from this reform. Use your knowledge of existing empirical evidence to respond to this question.

Assuming no tax avoidance (or evasion), there are three main possible behavioural responses: decrease in labour supply (both extensive and intensive margins), reduced rent seeking/bargaining and income shifting response.
According to past research, the first two are not likely to be prevalent.
Income shifting response: The TCJA was passed in December 2017, and the excise tax went into effect in 2018, so there could be a shift of 2018 income to 2017 but this would require that this tax was anticipated.
It's also usually the case that top executive's income have bumper years, and then go back to normal (see Rauh and Shyu (2019)). One response to the tax would then be to see payments more spread out over time, to limit the variance and therefore the total sums above the threshold.

c) Suppose you have access to execucomp data on the compensation of the top 5 employees at large US firms for years 2016-2019. Propose a simple empirical method to analyze whether the

behavioral responses you expect from b. effectively happened. State clearly the identification assumptions needed for the analysis to be valid.

Method: bunching-at-the-kink, comparing the distribution of payments around the million-dollar mark before and after the reform was implemented. If there are more payments just below the million dollar mark after the reform, and less right above, then there could be an income-shifting response.
Assumption: the new tax is the only thing the affects what side of cutoff people are on after the reform.
To analyse the variance idea we would need more years of data.
Note: since you only have data on the compensation of the top 5 employees you can't use a diff-in-diff since no control group.