Progressive Taxation

Mark Huggett\textsuperscript{1}

\textsuperscript{1}Georgetown

March 22, 2018
In “The Case for a Progressive Tax: From Basic Research to Policy Recommendations”, Diamond and Saez (2011) review the literature on optimal taxation to distill a few policy recommendations:

▶ “Recommendation 1: Very high earners should be subject to rising marginal tax rates and higher rates than current U.S. policy for top earners.”

▶ The formula $\tau^* = 1/(1 + a\epsilon)$ specifies the top tax rate $\tau^*$ that maximizes revenue from top earners.

▶ $\tau^* = 1/(1 + a\epsilon) = 1/(1 + 1.5 \times 0.25) = .73$, given their reading of US evidence ($a = 1.5, \epsilon = 0.25$).

▶ These notes highlight the (i) theory, (ii) data and (iii) empirical methods behind this calculation.
**Theory:** \( \tau^* = \frac{1}{1 + a\epsilon} \)

- Step 1: Define \( \text{Revenue}(\tau) \) to be revenue (per person) from top earners for earnings above a threshold \( \epsilon \):

  \[ \text{Revenue}(\tau) = \tau E[e - \epsilon] \]

**Comment:**
1. \( E[e - \epsilon] \) is a short-hand notation that expresses the calculation of mean earnings in excess of the threshold \( \epsilon \) per agent, **among the model agents with earnings in excess of the threshold \( \epsilon \)**.
2. \( E[e - \epsilon] \) is a function of the tax rate \( \tau \) on top earners.
3. The theory ignores the possibility that tax revenue changes due to the behavior of earners below \( \epsilon \) when the top tax rate \( \tau \) changes.
Step 2: Maximum revenue:
\[
\frac{dRevenue(\tau)}{d\tau} = \frac{d\tau E[e-e]}{d\tau} = 0
\]
\[
E[e - e] + \tau \frac{dE[e - e]}{d(1 - \tau)} \frac{d(1 - \tau)}{d\tau} = 0
\]
\[
E[e - e] - \tau \frac{dE[e - e]}{d(1 - \tau)} = 0
\]
\[
E[e - e] - \frac{\tau}{(1 - \tau)} \left\{ \frac{dE[e]}{d(1 - \tau)} \frac{(1 - \tau)}{E[e]} \right\} E[e] = 0
\]
\[
1 - \frac{\tau}{(1 - \tau)} \left\{ \frac{dE[e]}{d(1 - \tau)} \frac{(1 - \tau)}{E[e]} \right\} \frac{E[e]}{E[e - e]} = 0
\]
Progressive Taxation

- Step 3: Reorganize Using $\epsilon = \left\{ \frac{dE[e]}{d(1-\tau)} \frac{(1-\tau)}{E[e]} \right\}$ and $a = \frac{E[e]}{E[e-e]}

$$1 - \frac{\tau}{(1-\tau)} \left\{ \frac{dE[e]}{d(1-\tau)} \frac{(1-\tau)}{E[e]} \right\} \frac{E[e]}{E[e-e]} = 0$$

$$1 - \frac{\tau}{(1-\tau)} \epsilon a = 0$$

$$\tau^* = 1/(1 + a\epsilon)$$

Bottom Line: Need to know only two things to figure out the revenue maximizing top tax rate beyond some income threshold.

(1) how much income there is beyond the threshold: $a = \frac{E[e]}{E[e-e]}

(2) how responsive that income is to taxation: $\epsilon = \left\{ \frac{dE[e]}{d(1-\tau)} \frac{(1-\tau)}{E[e]} \right\}$
Data: Pareto statistic

1. Pareto statistic: \[ a \equiv \frac{E[e]}{E[e-e]} \]

2. Diamond and Saez examine the distribution of income and compute the Pareto statistic for a wide variety of income thresholds \( e \) including thresholds well past the top 1 percent threshold. They calculate that \( a \approx 1.5 \) in 2005 when Adjusted Gross Income (AGI) is the measure of income. AGI includes labor income, interest, business income, capital income (e.g. dividends and capital gains) and some tax adjustments.
Progressive Taxation

Pareto Statistic: Adjusted Gross Income

The key remaining empirical ingredient to implement the formula for the optimal tax rate is the elasticity of top incomes with respect to the net-of-tax rate. With the Pareto parameter $\alpha = 1.5$ if $z^* = 0.25$, a mid-range estimate from the empirical literature, then

$$\tau^* = \frac{1}{1 + 1.5 \times 0.25} = 0.73 \text{ percent},$$

substantially higher than the current 42.5 percent top U.S. marginal tax rate (combining all taxes).

Figure 2
Empirical Pareto Coefficients in the United States, 2005

$$a = \frac{z_m}{(z_m - z^*)} \text{ with } z_m = E(z \mid z > z^*)$$

$$\alpha = \frac{z^* h}{(z^*)/(1 - H(z^*))}$$

$z^* = $Adjusted gross income (current 2005 $)
Pareto Statistic: Earnings, Income and Wage and Salary

Pareto Statistic: US 1917-2012

- Male Earnings 99th
- Income 99th
- Wage and Salary 99th
Evidence: Earnings or Income Elasticity

1. A Key Elasticity: $\epsilon \equiv \left\{ \frac{dE[e]}{d(1-\tau)} \frac{(1-\tau)}{E[e]} \right\}$

2. Tax reforms alter marginal tax rates on some households to a different degree than others. Under Reagan in the 1980’s, marginal tax rates on high income households were lowered. One can use data on the percentage change in income or earnings (over a few years) to determine how responsive or unresponsive income is to a percentage change in marginal tax rates.

3. DS (2011) suggest $\epsilon = 0.25$ is a “midrange estimate” and that $\epsilon = 0.57$ is a “conservative upper bound” based on US data.
Empirical Methods: Elasticity

1. Estimate the "elasticity" $\epsilon$ using reduced-form methods:

$$\log(top\ 1\%\ share_t) = \alpha + \epsilon \log(1 - MTR_t) + \gamma t + \nu_t$$

$$\log \frac{z_{it+1}}{z_{it}} = \epsilon \log\left(\frac{1 - \tau_{t+1}(z_{it+1})}{1 - \tau_t(z_{it})}\right) + \beta f(z_{it}) + \alpha_t + \nu_{it+1}$$

2. Share regression US 1960-2000: $\epsilon = 0.85\ (0.21)$ linear trend Saez (2004).


4. Panel regression US 1991-97: $\epsilon \in [0.143 - 0.564]$ with various income controls $f(z)$: Saez, Slemrod and Giertz (2012).
Top 1 Percent Average Marginal Tax Rates

Mertens (2015) calculates the average marginal tax rate on earnings (federal income tax and medicare tax) for those in the top 1 percent. This rate fell after the Tax Reform Act of 1986.
Progressive Taxation

**Top 1 Percent: US**

*J.S. Income Shares of Top 1% and Top 0.1% Households – Incl. Capital Gains (1913-2013)*

Source: Piketty & Saez – January 2015
Top Tax Rates: US and Europe
What Does the Labor Income Tax Rate Schedule in the US Look Like?

One answer: use a tax calculator called TAXSIM. Plug income into TAXSIM in 1,000 dollar increments. TAXSIM calculates a marginal tax rate for a two person household living in a specific state in 2010. The marginal rate at a given income level accounts for federal and state income taxation and for social security and medicare taxation of earnings. Average the rate schedules (across states) to get the “US Rate Schedule” on the next page.

Note: The schedule “jumps” at income levels where new tax brackets begin or end. The schedule is somewhat flat beyond $250K.
Progressive Taxation

Labor Income Tax Rate Schedule: US 2010
Discussion:

1. Tax policy is not only concerned with maximizing revenue. Nevertheless, revenue maximization is useful.

Point 1: If raising tax rates beyond the top of the Laffer curve is not sensible, then knowing the top of the Laffer curve (i.e. the revenue maximizing top rate) is useful.

Point 2: A utilitarian social welfare function weights the utility of different households with equal weights. If marginal utility of consumption declines, then the marginal utility of consumption for top earners is arguably small (not zero) in comparison to non-top earners.
Discussion:

2. Diamond and Saez argue that the marginal earnings tax rate on top earners in the US is about 42.5 percent in 2010 based on the top federal tax rate for income taxes, 35 percent in 2010, and the fact that there are other taxes on top earners (e.g. state income taxes, medicare taxes and sales taxes).

3. As $73 > 42.5$, there is substantial room for increasing the marginal tax rate on the top 1 percent of US households.

4. The top federal rate was 35 in 2010, was later increased to 39.6 under Obama and is now 37 percent under Trump.