

Public Economics: Lecture 14

Optimal Income Taxation: Extensions

Cameron LaPoint

Columbia University

August 2, 2017

Optimal progressivity formula

- Previously we solved for the tax rate in the optimal income taxation model where taxpayers differ based on ability to earn income
- **Optimal progressivity formula (OPF):**

$$\frac{t}{1-t} = - \frac{\text{cov}\left(\lambda_i, \frac{I_i}{I^M}\right)}{\frac{1}{N} \sum_{i=1}^N \epsilon^i \cdot \frac{I_i}{I^M}} = \frac{\text{equity}}{\text{efficiency}}$$

- Numerator term: how much does the government care about equity?
 - ▶ A lot if the weight put on a taxpayer's utility and their income relative to the average are significantly and inversely related
- Denominator term: efficiency cost from taxation captured by the elasticity of taxable income with respect to the replacement rate
 - ▶ Taxing people decreases their incentive to work \implies moral hazard cost

How can non-tax policy influence the OPF?

- The optimal income tax problem can be thought of as a particular kind of **adverse selection** problem that a government faces
 - ▶ The $i = 1, \dots, N$ taxpayers each have a different type determined completely by their wage w_i
 - ▶ Govt. cannot observe the wage itself – it only observes income, which is a combination of wages and labor supply (ability \neq effort)
 - ▶ Income is an (imperfect) proxy for ability \implies tax rate can be low if income is distinct from ability
- Policymakers can affect the reliability of income as a signal of ability to pay – how is income defined in the tax code?
 - ▶ Example: carefully structure the tax code so that income is defined using the Haig-Simons criterion
- Can also affect taxable income elasticities ϵ by making tax avoidance and evasion difficult (more on this later)

Extensions of the basic income tax model

- In this lecture we consider two extensions of the optimal income tax framework motivated by research on recent inequality dynamics
- ① Non-linear income taxation: given the growing concentration of income at the very top of the distribution, what factors determine the optimal top marginal tax rate?
- ② Superstar effects: how does the OPF change when earnings are a convex function of effort/labor supply chosen by taxpayers (i.e. increasing at an increasing rate in effort)
 - ▶ Basic model assumes income is linearly related to labor supply: $I_i = w_i \cdot L_i$, but in reality the relationship is highly non-linear
 - ▶ Two possible explanations for superstars: matching in the labor market and rents/monopoly power of certain types of workers

Non-linear income tax: top income tax rate

- We want to relax the assumption that $T'(I) = t$ by allowing the income tax schedule to be non-linear
- Rather than solving for the full tax schedule (very complicated), we focus on the marginal tax rate at the top of the income distribution
- To get a simple formula we make some assumptions...
 - ▶ No income effect from increasing revenue
 - ▶ Govt. puts no welfare weight on the utility of the highest earners (strong preference for redistribution away from the top)
- We then end up the optimal top MTR as a function of two parameters that can be estimated:

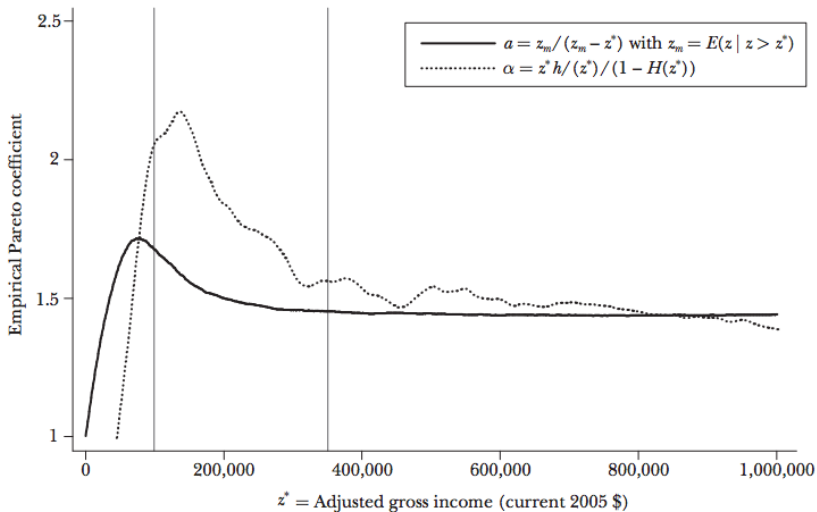
$$t = \frac{1}{1 + a \cdot \epsilon}$$

Optimal top tax rate – analysis

$$\text{Optimal top tax rate: } t = \frac{1}{1 + a \cdot \epsilon}$$

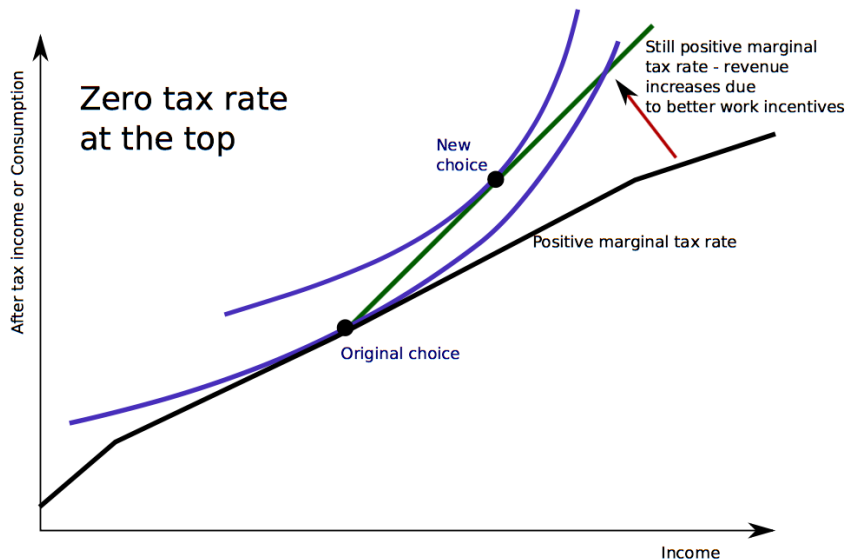
- ϵ is the elasticity of taxable income at the top of the earnings distribution (efficiency cost)
- $a > 1$ is the **Pareto parameter**: it summarizes the shape of the income distribution at the right tail
- A large a means that few people have taxable incomes z^* higher than any given value z (not much additional revenue can be collected)
- As $a \rightarrow 1$, income becomes more concentrated at the top \implies govt. better able to redistribute away from top earners by raising the MTR
- ϵ difficult to estimate because need to document evasion/avoidance behaviors – estimates range from 0.2 to 1.0
- $a \approx 1.5$ for the U.S. and likely moving closer to 1

Empirical Pareto Coefficients in the United States, 2005

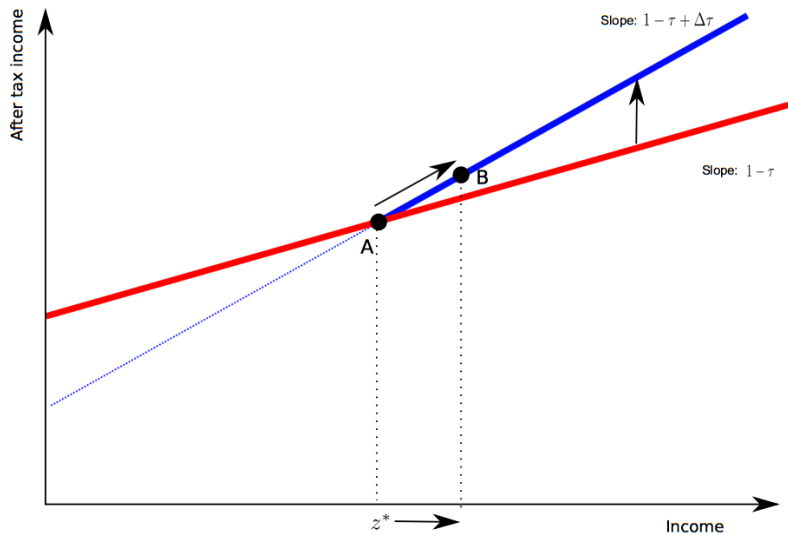


Source: Diamond & Saez (2011), "The Case for a Progressive Tax: from Basic Research to Policy Recommendations," *Journal of Economic Perspectives*

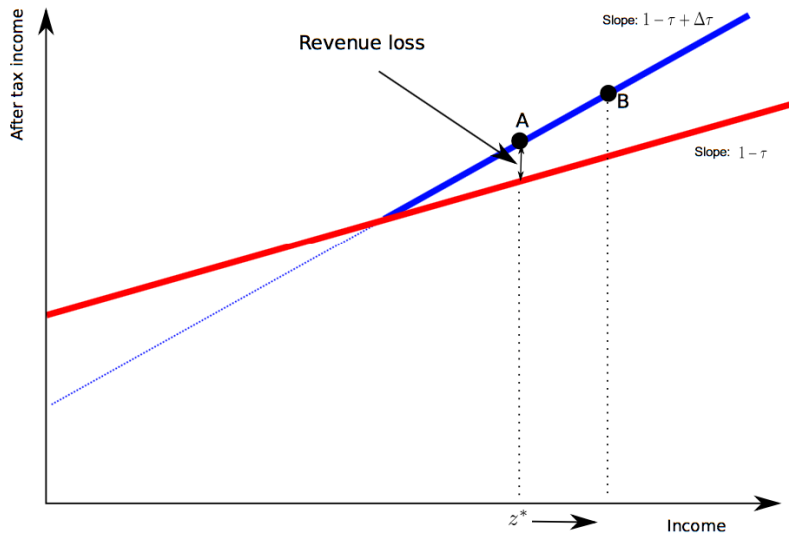
Non-linear income tax: zero tax rate at the top



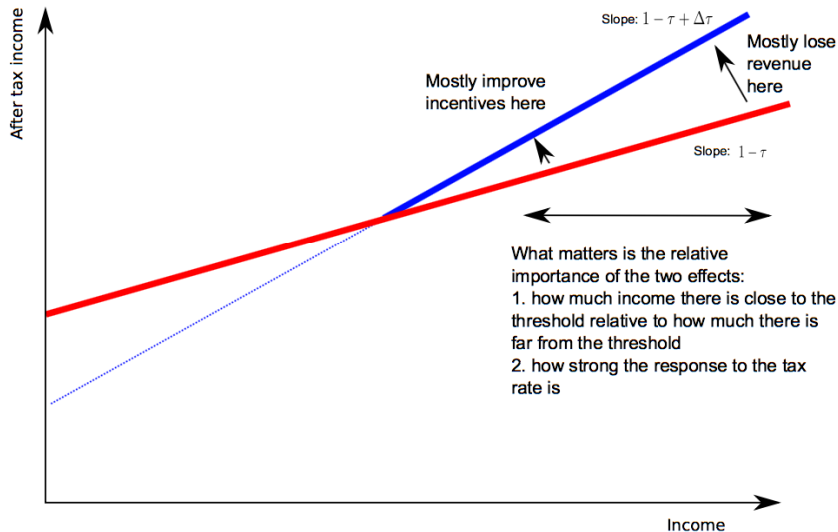
Change in top tax rate: incentive effect



Change in top tax rate: revenue cost



Non-zero tax rate at the top

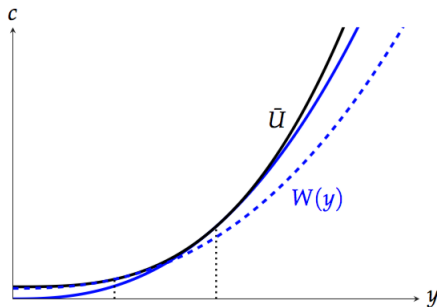


Superstar effects in the labor market

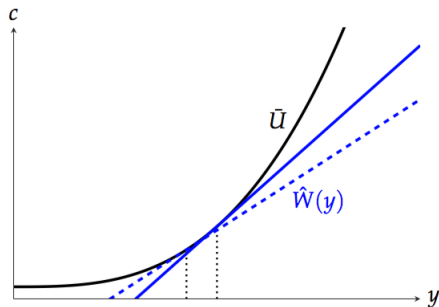
- In the optimal linear income tax model could instead assume income for each type $I_i = f(w_i, L_i)$ is a non-linear function of labor supply
- Superstar effects occur when earnings are *convex* in labor supply, or $\partial f / \partial L > 0$ and $\partial^2 f / \partial L^2 > 0$
- Theoretical implication: earnings are even more responsive to taxation relative to the linear income case
 - ▶ Higher taxable income elasticity ϵ for superstars increases the efficiency cost from income taxes
 - ▶ Superstar effects thus provide a force for *lower* MTRs in the optimal income tax framework
 - ▶ Results are conditional on observing the same income distribution in the data, so only the denominator in the OPF changes

Superstar effects – convex earnings schedule

(a) Superstar effects



(b) No superstar effects



Source: Scheuer & Werning (2016), "The Taxation of Superstars," *Quarterly Journal of Economics*

Why are there superstar effects?

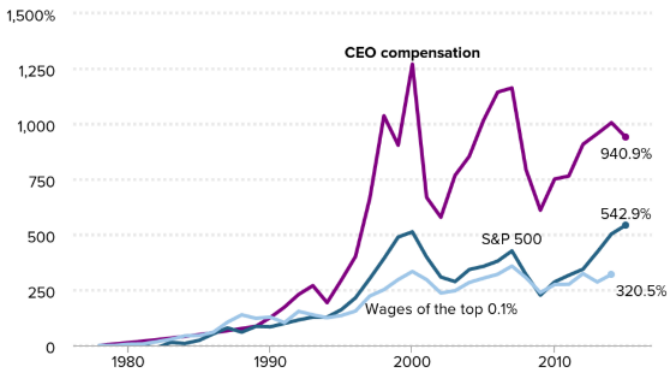
- 1 **Positive assortative matching:** high-talent individuals “match” with the most profitable firms
 - ▶ Due to the convex earnings schedule, matching implies that small differences in talent can generate large differences in incomes
 - ▶ Evidence from labor market for CEOs: more highly paid CEOs tend to match to larger firms (Gabaix & Landier 2008)
 - ▶ Match function $x = \sigma(w)$ matches workers with ability w to firm x
 - ▶ Convex earnings distribution occurs when firm size x and worker effort are complementary inputs in the production of the firm

$$A(x, L(w)) = A(\sigma(w), L(w)) \text{ and } \partial^2 A / \partial x \partial L > 0$$

- 2 **Rents/monopoly power:** certain types of labor have no close substitutes in the labor market and thus command a wage premium
 - ▶ Example: rockstars and concert ticket prices – low marginal cost of adding a concert to tour schedule and no close substitutes

CEO compensation has grown faster than the wages of the top 0.1 percent and the stock market

Cumulative percentage change in CEO compensation, wages of the top 0.1 percent, and the S&P 500, 1978–2015



Notes: Wage data for the top 0.1 percent is not yet available for 2015.

Source: EPI analysis of Compustat Execucomp, Social Security Administration, and Federal Reserve Bank of St. Louis databases.

Economic Policy Institute

Positive assortative matching in the CEO labor market

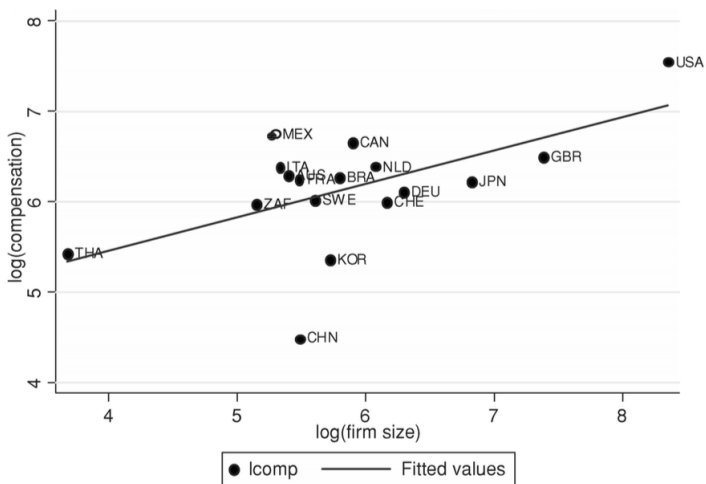


FIGURE II
CEO Compensation versus Firm Size across Countries

Source: Gabaix & Landier (2008), "Why Has CEO Pay Increased So much?" *Quarterly Journal of Economics*

Simple model of CEO sorting into firms

- Gabaix & Landier (2008) model of positive assortative matching
- N firms of different sizes, where firm 1 is the smallest and firm N is the largest
- N managers of different talent levels, where manager 1 is the least talented and N is the most talented
- Each talent level T commands earnings $W(T)$ in the market
- Firms face a two-stage problem: first pick the optimal talent level T that maximizes future profits given the earnings function $W(T)$
- Then pick the manager to hire that yields the optimal talent level
⇒ most talented manager always sorts to the largest firm, the second-most talented sorts to the second-largest, and so on...
- See Problem 2 of Problem Set 5

Summary

- Solution to the basic optimal linear income tax problem features a trade-off between government preference for equity and efficiency
- In the non-linear version of the problem, taxpayers pay different tax rates depending on their income
 - ▶ Key difference: the distribution at the right tail of the income distribution matters for the top marginal tax rate
 - ▶ Evidence on inequality suggests that mass of high-income individuals has grown \implies top MTRs should be revised upward
- Allowing for superstar effects increases the responsiveness of earnings to tax changes \implies MTRs should be revised downward
 - ▶ More work needs to be done to determine whether such effects are due to rents or positive assortative matching