

## Topic 2: Redistributive Concerns

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Spring, 2020

## Last Class

- ▶ Recall: Last class we motivated a benefit cost ratio for welfare analysis

$$MVPF = \frac{WTP}{Cost}$$

- ▶ Motivates welfare comparisons:
  - ▶ Pareto comparisons when policies have the same distributional incidence
  - ▶ Okun's bucket / social welfare weights when different incidence
- ▶ But most policies have different distributional incidence – can we do more?
  - ▶ Motivated by Kaldor-Hicks “efficiency” tests

## Distributional Incidence

- ▶ Suppose there's a budget-neutral policy that hurts the poor and helps the rich.
- ▶ The rich are willing to pay \$1.5 for the policy
- ▶ The poor are willing to pay \$0.5 to prevent the policy from going into place
- ▶ Should we do the policy?

## Distributional Incidence

- ▶ Two common economic methods for resolving interpersonal comparisons
- 1. Social welfare function (Bergson (1938), Samuelson (1947), Diamond and Mirrlees (1971), Saez and Stantcheva (2015))
  - ▶ Allows preference for equity
  - ▶ Do the policy only if \$1.50 to the rich is valued more than \$0.5 to the poor:

$$\frac{\eta^{rich}}{\eta^{poor}} > \frac{1}{3}$$

- ▶ Subjective choice of researcher or policy-maker
- 2. Kaldor Hicks Compensation Principle (Kaldor (1939), Hicks (1939, 1940))
  - ▶ Motivates aggregate surplus, or “efficiency”, as normative criteria
    - ▶ \$1.50 - \$0.50 = \$1 > 0  $\implies$  do the policy
    - ▶ Ignores issues of “equity”

# Kaldor Hicks: Motivating Aggregate Surplus

- ▶ Suppose individuals,  $i$ , are willing to pay  $s_i$  for a policy change.
  - ▶ Pareto only if  $s_i > 0$  for all  $i$
  - ▶ In general,  $s_i > 0$  and  $s_j < 0$  for some  $i$  and  $j$ 
    - ▶ What to do?
- ▶ Kaldor Hicks: Suppose we consider alternative policy that also has taxes/transfers to individuals,  $t_i$ .
  - ▶ How much can we tax each individual and break even?
  - ▶ Aggregate surplus

$$t_i^{max} = s_i$$

- ▶ Potential Pareto improvement if and only if

$$\sum_i t_i^{max} > 0 \iff \sum_i s_i > 0$$

- ▶ If total (unweighted) surplus is positive, then the government can institute taxes + the policy to make everyone better off

## This Lecture

- ▶ Kaldor and Hicks provide novel method to resolve interpersonal comparisons
  - ▶ Use individual-specific lump-sum transfers to neutralize interpersonal comparisons
- ▶ BUT: Key insight of Mirrlees and optimal tax literature: Can't do individual-specific lump-sum taxes
  - ▶ Want to tax two people with the same income differently (high effort low luck vs. low effort high luck)
- ▶ This lecture: Modify Kaldor-Hicks so that transfers are incentive compatible (Mirrlees (1971))
  - ▶ Apply to MVPF calculations in Topic 1
  - ▶ Key idea: Kaldor-Hicks motivates comparing MVPF of policy to MVPF of distributionally-equivalent tax cut

## This Lecture

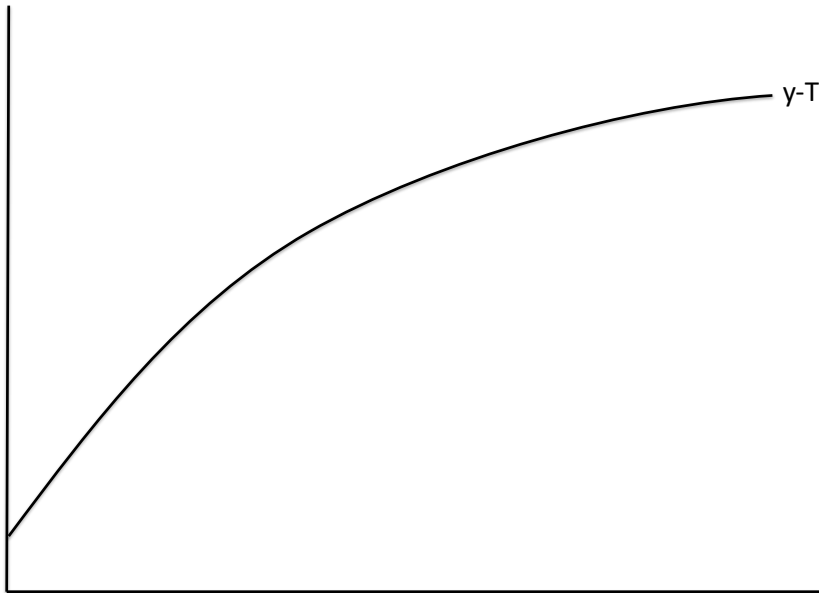
- ▶ Hicks (1939) writes:
  - ▶ *“If, as will often happen, the best methods of compensation feasible involve some loss in productive efficiency, this loss will have to be taken into account. (Hicks, 1939)”*
- ▶ Loosely follow mathematical models in Hendren (2017) “Efficient Welfare Weights”
  - ▶ GE version in Tsyvinski and Werquin (2018)
- ▶ Other key readings:
  - ▶ Main ideas first presented in Mirrlees (1976) (A classic!)
  - ▶ Empirically implemented in inverse optimum literature (Bourguignon and Spadaro, 2012)
    - ▶ See also Hylland and Zeckhauser (1979), Coate (2000), Kaplow (1996, 2004, 2006, 2008)
  - ▶ Related to optimal income taxation (Mirrlees, 1971, Saez, 2001) covered in 2450A

## Exploiting the Envelope Theorem...

- ▶ Key idea: Envelope theorem allows for empirical method to account for distortions
  - ▶ Goal: turn unequal surplus into equal surplus using modifications to the tax schedule
    - ▶ Not individual-specific lump-sum transfers
  - ▶ Cost of moving \$1 of surplus differs from \$1 because of how behavioral response affects government budget
- ▶ Suppose we want to provide transfers to those earning near  $y^*$

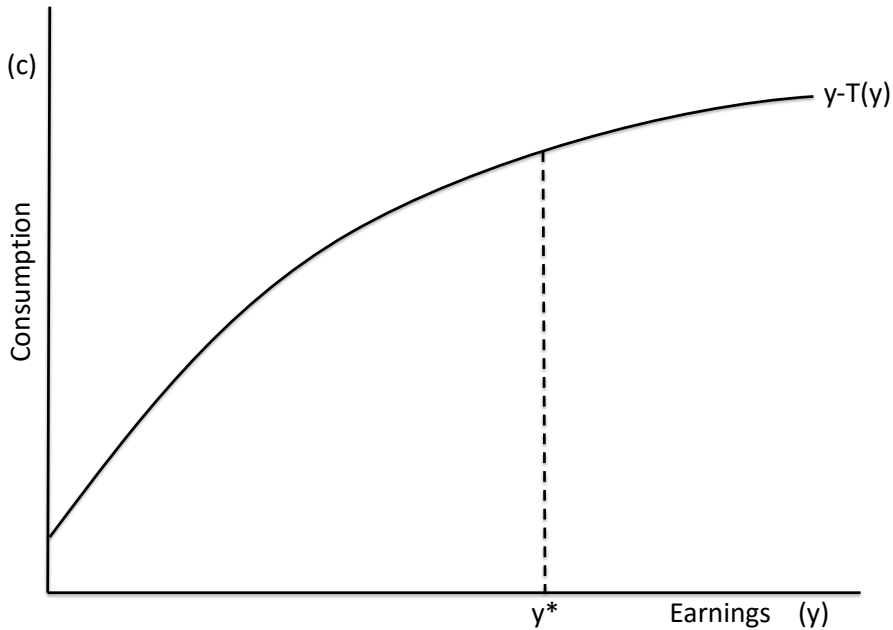
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Consumption



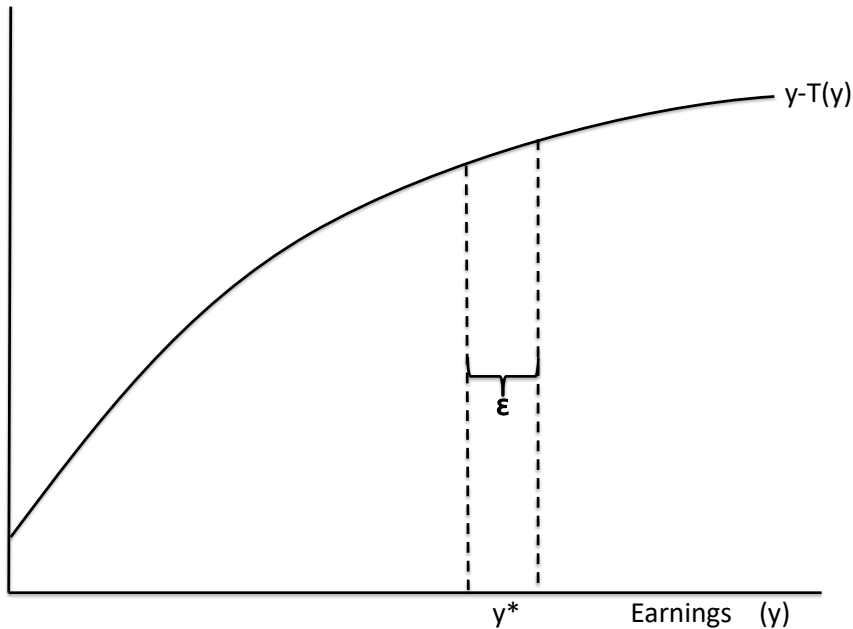
Earnings (y)

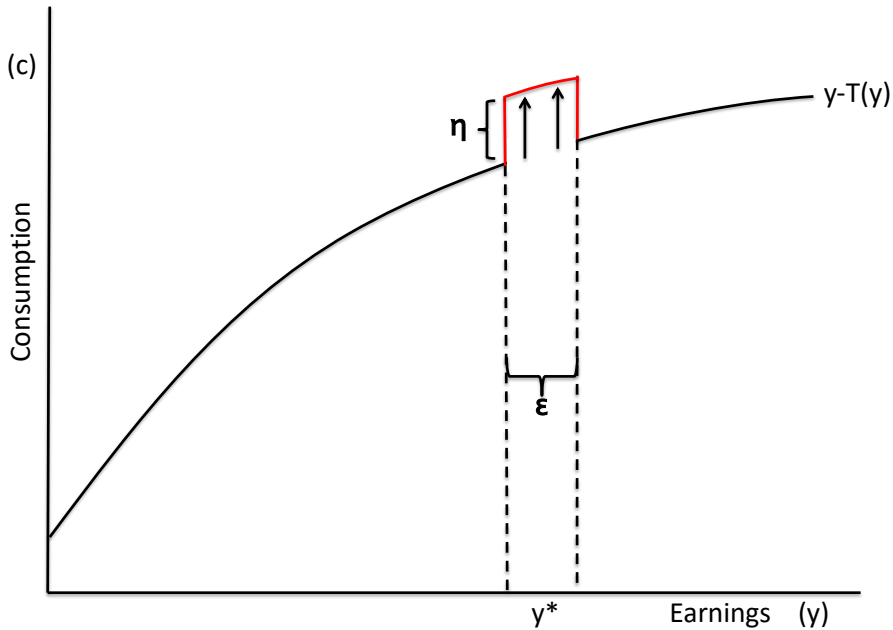
$y-T(y)$

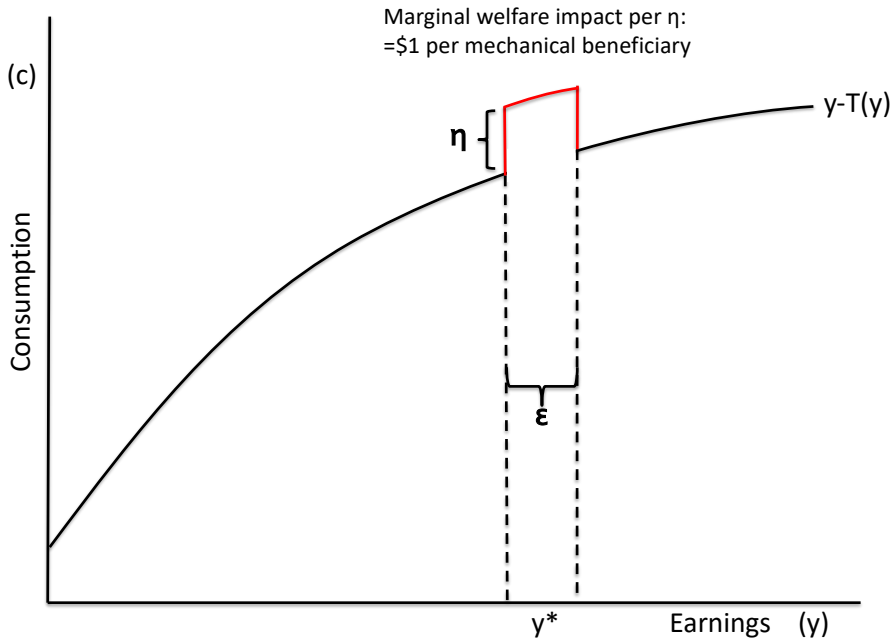


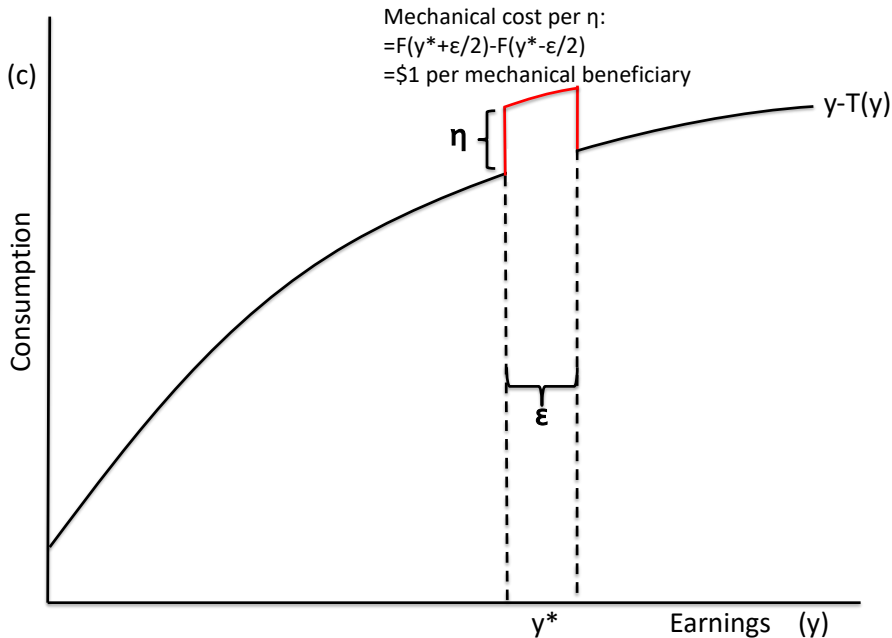
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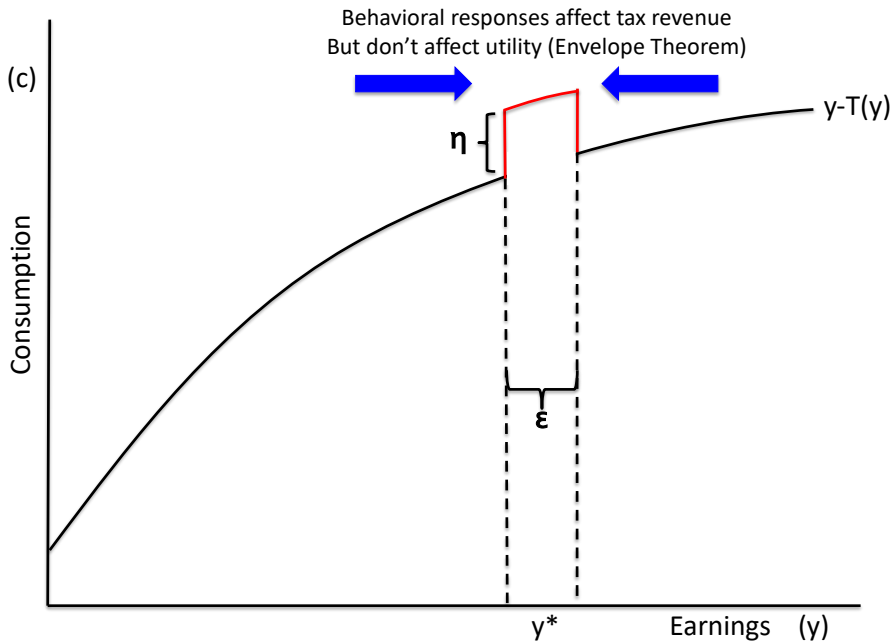
Consumption

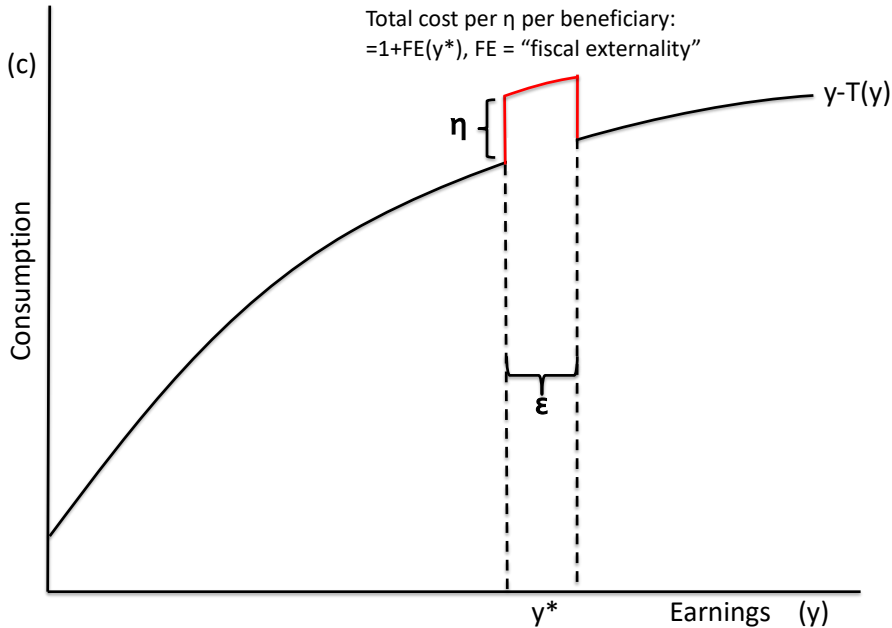












## Weights

- ▶ Consider the function:

$$\tilde{g}(y) = 1 + FE(y)$$

or the normalized function

$$g(y) = \frac{1 + FE(y)}{1 + E[FE(y)]}$$

- ▶ To first order: \$1 surplus to those earning  $y$  can be turned into  $\$g(y) / n$  surplus to everyone through modifications to tax schedule
- ▶ Fiscal externality logic does not rely on functional form assumptions
  - ▶ Allows for each person to have her own utility function and arbitrary behavioral responses
  - ▶ Extends to multiple policy dimensions (Later if time...)
- ▶ For now, find empirical expression for  $FE(y)$

# Mathematical Derivation

- ▶ What is the marginal cost of a tax cut to those earning near  $y$ ?
- ▶ Consider calculus of variations in  $T(y)$ 
  - ▶ Define  $\hat{T}(y; y^*, \epsilon, \eta)$  by

$$\hat{T}(y; y^*, \epsilon, \eta) = \begin{cases} T(y) & \text{if } y \notin (y^* - \frac{\epsilon}{2}, y^* + \frac{\epsilon}{2}) \\ T(y) - \eta & \text{if } y \in (y^* - \frac{\epsilon}{2}, y^* + \frac{\epsilon}{2}) \end{cases}$$

- ▶  $\hat{T}$  provides  $\eta$  additional resources to an  $\epsilon$ -region of individuals earning between  $y^* - \epsilon/2$  and  $y^* + \epsilon/2$ .
- ▶ Given  $\hat{T}$ , individual of type  $\theta$  chooses  $\hat{y}(y^*, \epsilon, \eta; \theta)$  that maximizes utility
  - ▶ Some people who earn near  $y^*$  might move away from  $y^*$  because the government is taxing them more (or move towards  $y^*$  if  $\eta < 0$ )

## Causal effects (vs. IC constraints)

- ▶ Define choice of income,  $y$ , in environment with  $\epsilon$  and  $\eta$  by

$$\hat{y}(\theta; y^*, \epsilon, \eta) = \operatorname{argmax} u(y - \hat{T}(y; y^*, \epsilon, \eta), y; \theta)$$

- ▶ How does this relate to IC constraints in mechanism design approach?
  - ▶ Embedded in  $\hat{y}$  function - we substitute the maximization program into the resource constraint and assume observed behavior maximizes the IC constraint
  - ▶ Trade causal effects of tax variation for structural assumptions of type distribution and shapes of preferences
    - ▶ Causal effects are sufficient...

# Marginal Cost of Taxation

- ▶ Given choices  $\hat{y}(y^*, \epsilon, \eta; \theta)$ , government revenue is given by

$$\hat{q}(y^*, \epsilon, \eta) = \frac{1}{\Pr\{y(\theta) \in [y^* - \frac{\epsilon}{2}, y^* + \frac{\epsilon}{2}]\}} \int_{\theta} [\hat{T}(\hat{y}(\theta; y^*, \epsilon, \eta); y^*, \epsilon, \eta) - T(y(\theta))] d\mu(\theta)$$

(normalized by the number of mechanical beneficiaries).

- ▶ Note  $\hat{q}(y^*, 0, \eta) = \hat{q}(y^*, \epsilon, 0) = 0$  for all  $\epsilon$  and  $\eta$
- ▶ Marginal cost of a tax cut to those earning near  $y$ :

$$1 + FE(y) = \lim_{\epsilon \rightarrow 0} \frac{\partial \hat{q}(y, \epsilon, \eta)}{\partial \eta}$$

- ▶ Note the MVPF of a tax cut to those earning near  $y$  is...?

# Key Assumptions

- ▶ What are the key assumptions to obtain this representation of the cost of taxation?
  - ▶ Partial equilibrium / “local incidence”
  - ▶ Behavioral response only induces a fiscal externality
  - ▶ Other incidence/externalities would need to be accounted for
  - ▶ Others?

## Two Types of Policies

- ▶ Basic Idea: Use  $1 + FE(y)$  to weight individual willingness to pay for a policy
  - ▶ Implements modified Kaldor-Hicks in which transfers occur through income tax schedule
- ▶ Broadly, two types of policies to consider:
  - ▶ Changes to the tax schedule
  - ▶ Changes to other goods/transfers/etc

# Changes to the Tax Schedule

- ▶ To begin, what about policies that change the tax schedule?
  - ▶ Must be indifferent to these!
    - ▶ Why?
  - ▶ Suppose the tax schedule goes from  $T(y) \rightarrow T(y) + \epsilon h(y)$
  - ▶ Let  $s_\epsilon(y)$  denote individual  $y$ 's WTP for the policy change. And, let  $s(y) = \lim_{\epsilon \rightarrow 0} \frac{s_\epsilon(y)}{\epsilon}$  denote the individual's marginal willingness to pay for the tax change
  - ▶ Exercise: Show  $\int s(y) (1 + FE(y)) = 0$

## Werning 2007: Pareto efficient taxation

- ▶ But, can we say nothing about welfare of changes to the tax schedule?
- ▶ What if  $FE(y) < -1$ ?
  - ▶ Impact of behavioral response to tax change is larger than mechanical revenue raised from the tax
  - ▶ Local Laffer effect
- ▶ Werning 2007 shows that this characterizes when there exists Pareto efficient changes to tax schedule
  - ▶ Lowering taxes at  $y$  will improve everyone's welfare
    - ▶ Those with incomes near  $y$  pay less taxes
    - ▶ And there's more revenue to the government (which can be redistributed)

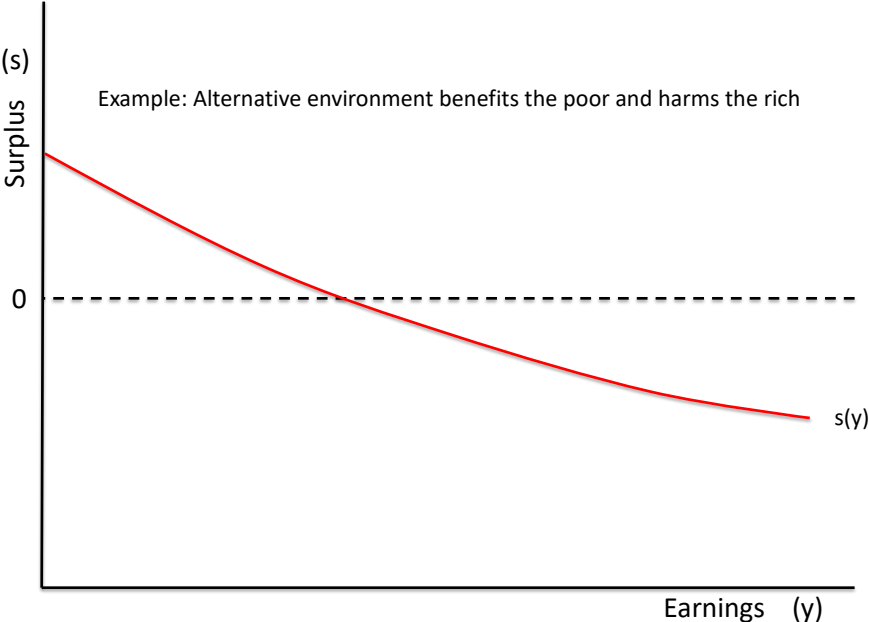
# Welfare Analysis of Non-Tax Policies

- ▶ What about the welfare impact of other (non-tax) policies?
- ▶ Given policy, let  $s(y)$  denote the WTP of individual earning  $y$  for the policy
  - ▶ Assume for simplicity WTP does not vary conditional on  $y$ .  
Given by:

$$s(y) = \frac{\frac{\partial u}{\partial G}}{\lambda}$$

- ▶ If  $s(y)$  is everywhere positive, then Pareto improvement
- ▶ But, how to resolve tradeoffs if  $s(y_1) < 0$  and  $s(y_2) > 0$ ?

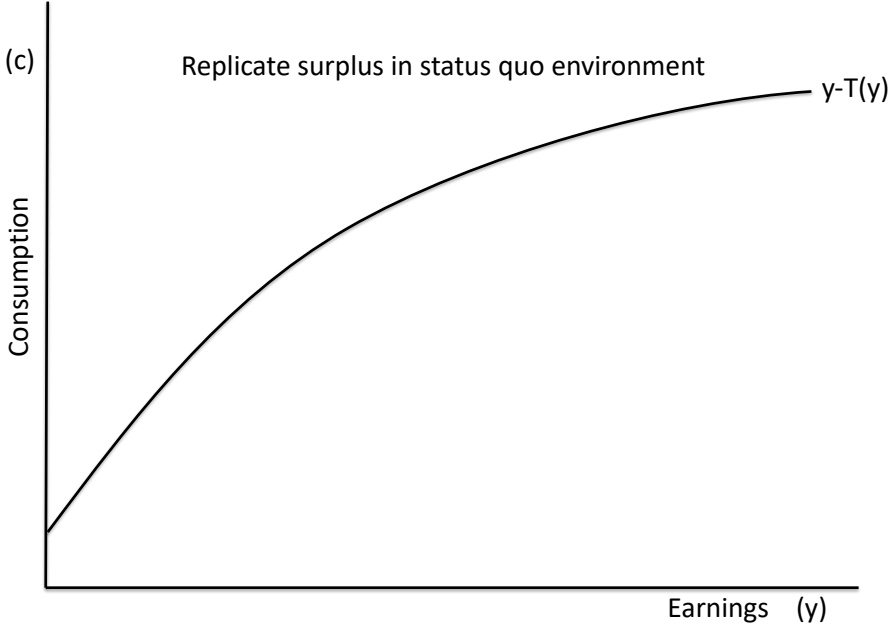
# Example: Alternative Environment Benefits Poor



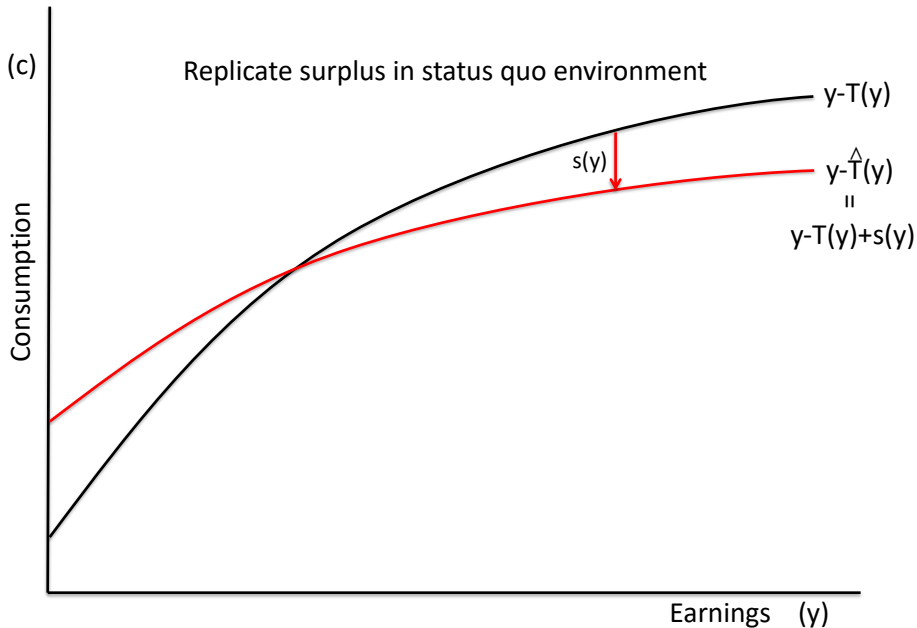
# EV and CV

- ▶ Given  $s(y)$ , let's consider a modified policy that neutralizes distributional comparisons
- ▶ Two ways of neutralizing distributional comparisons: EV and CV
- ▶ “EV”: modify status quo tax schedule
  - ▶ By how much can everyone be made better off in modified status quo world relative alternative environment?

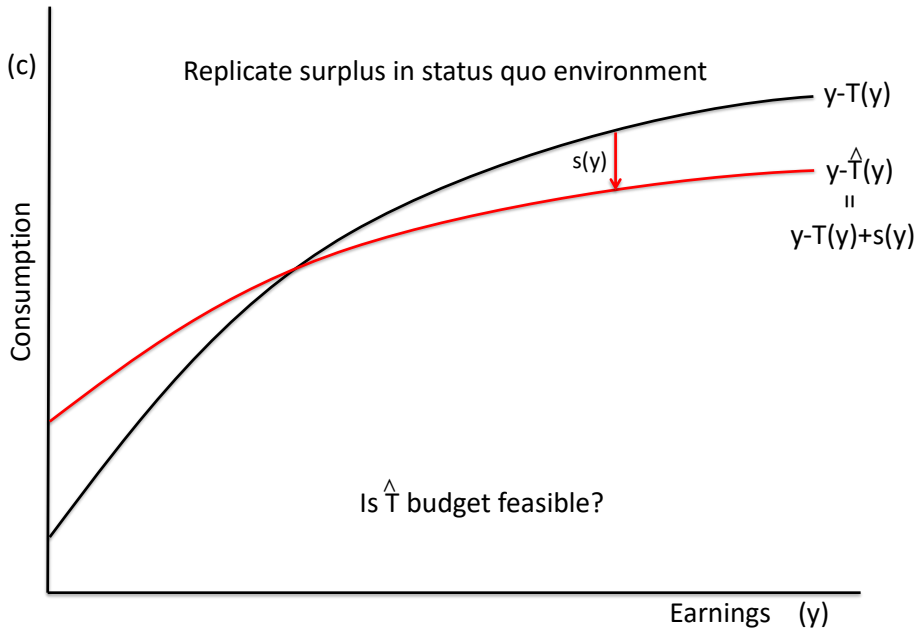
# “EV” Example



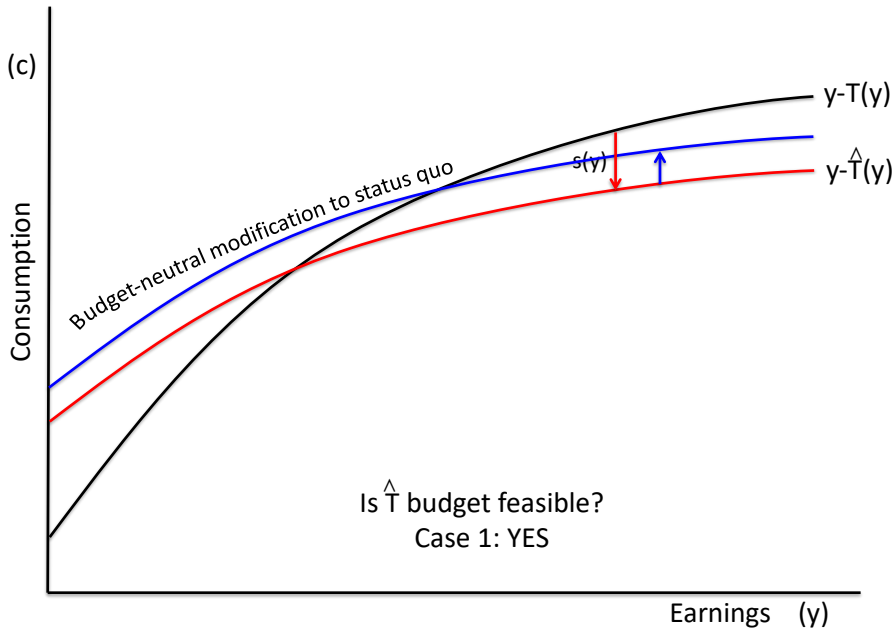
# “EV” Example



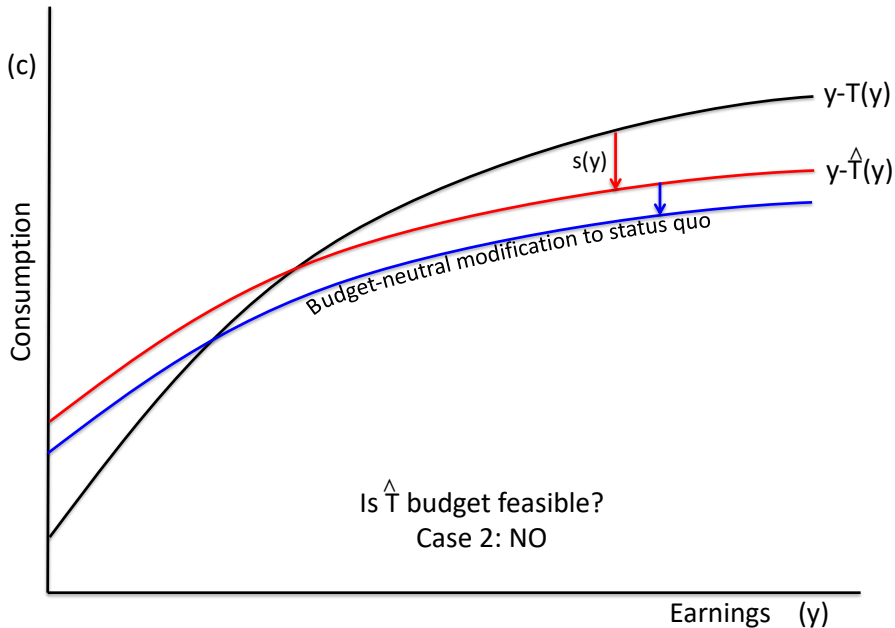
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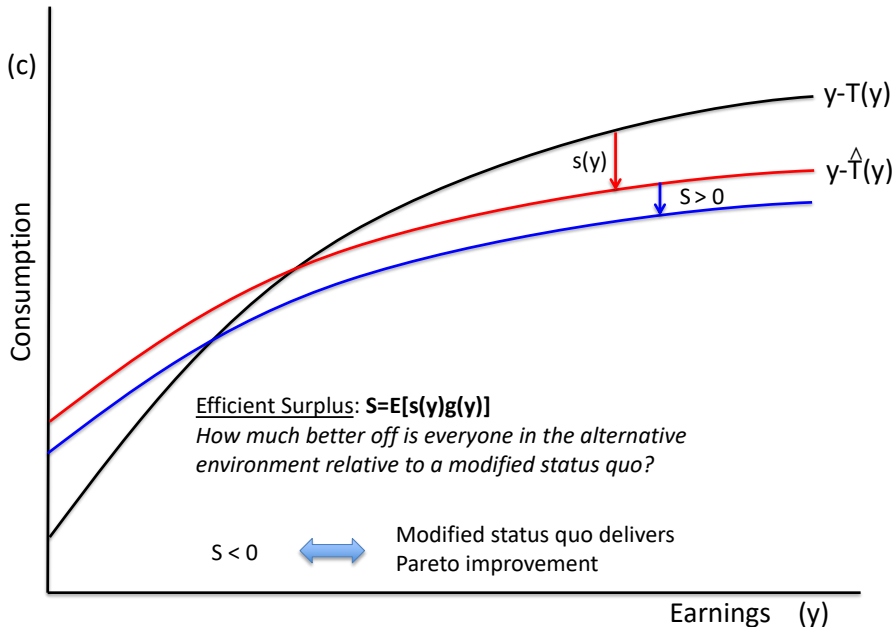
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# “EV” Example



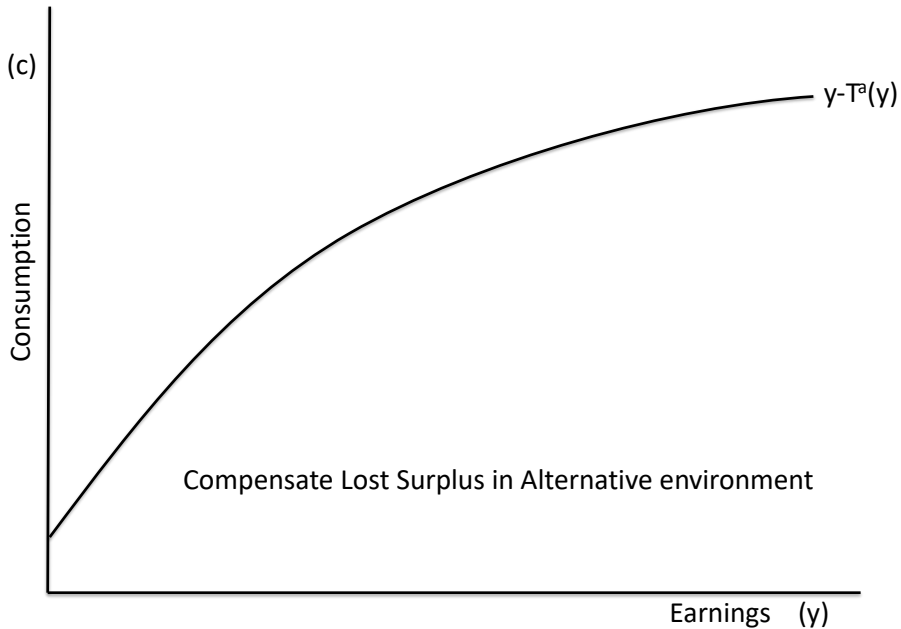
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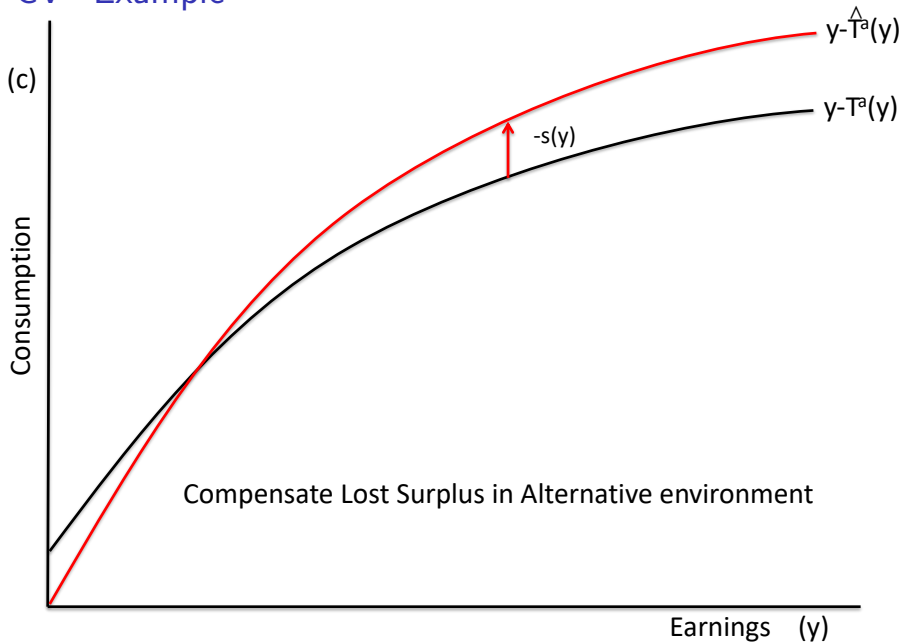
# EV and CV

- ▶ Given  $s(y)$ , two ways of neutralizing distributional comparisons
- ▶ “EV”: modify status quo tax schedule
  - ▶ By how much can everyone be made better off in modified status quo world relative alternative environment?
- ▶ “CV”: modify alternative environment tax schedule
  - ▶ By how much can everyone be made better off in modified alternative environment relative to status quo?

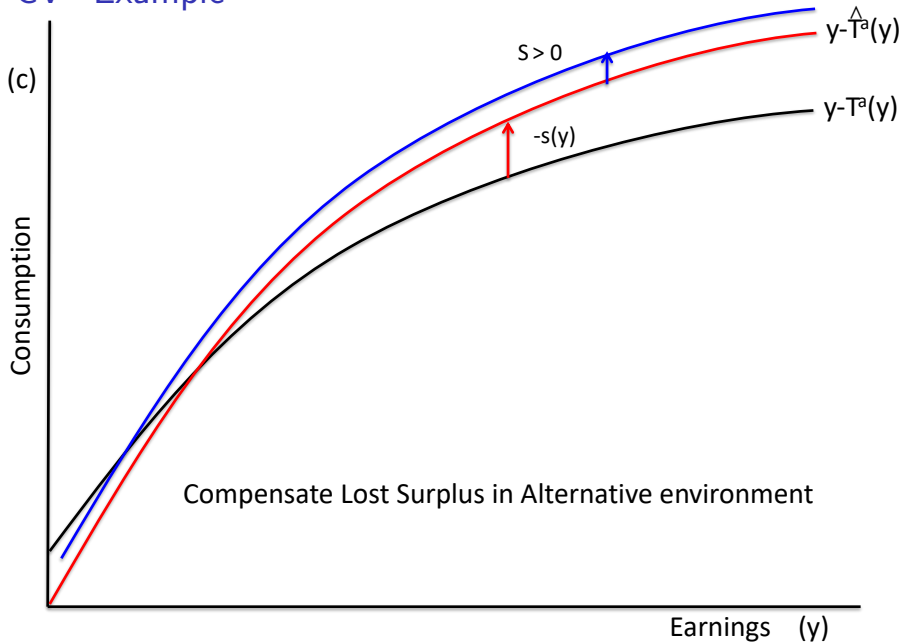
# “CV” Example



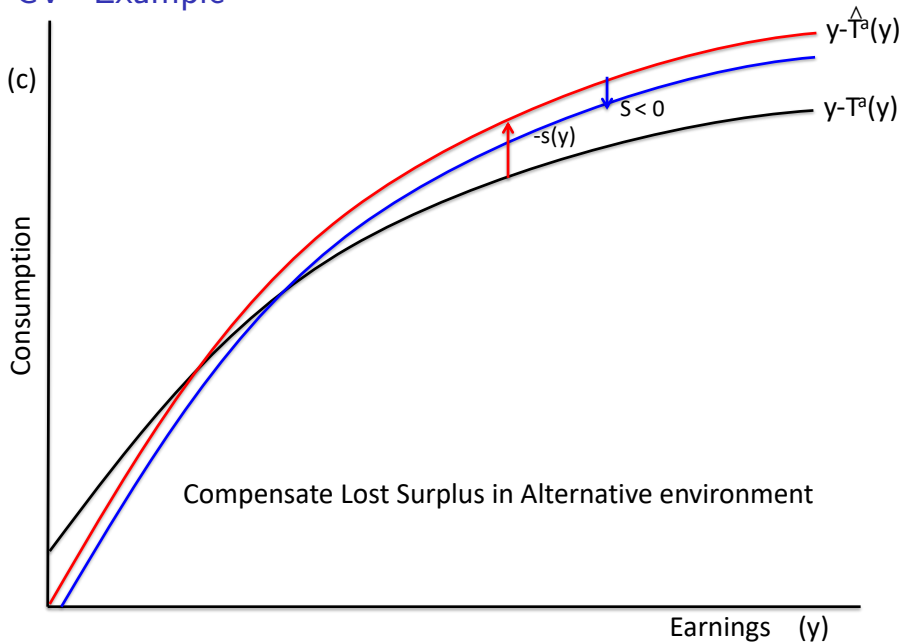
# “CV” Example



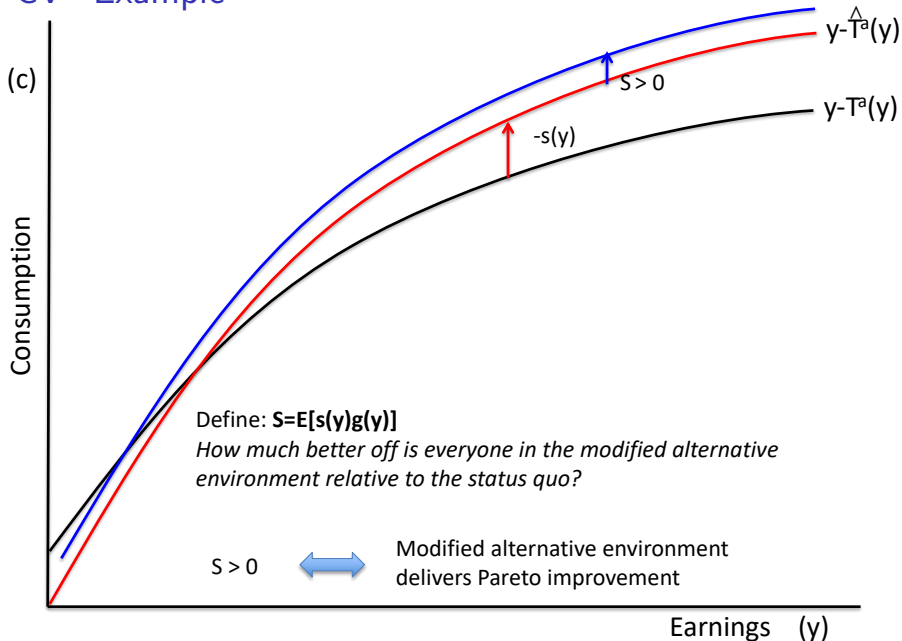
# “CV” Example



# “CV” Example



# “CV” Example



# Pareto Comparisons

- ▶ If  $g(y)$  is similar in status quo and alternative environment, then EV and CV are first-order equivalent
  - ▶ Proof?
  
- ▶ When surplus is homogeneous conditional on income:
  - ▶  $S$  provides first-order characterization of potential Pareto comparisons
  
  - ▶  $S$  quantifies difference between environments without making inter-personal comparisons
    - ▶ By how much is *everyone* better off?
    - ▶ What if surplus is heterogeneous conditional on income?

# Estimating the Marginal Cost of Taxation

- ▶ What do we need to estimate  $FE(y)$ ?
- ▶ A bunch of exogenous variation in the tax schedule
  - ▶ Combined with data on government revenue,  $q$
  - ▶ Then, compute

$$1 + FE(y) = \lim_{\epsilon \rightarrow 0} \frac{\partial \hat{q}(y, \epsilon, \eta)}{\partial \eta}$$

- ▶ But, need tax variation separate for each  $y$ !
  - ▶ In practice: look at responses to policy changes + add a bit of structure

# Behavioral Responses to Tax Changes

- ▶ Large literature studying behavioral responses to taxation
  - ▶ EITC causes people to:
    - ▶ Enter the labor force (**summary in Hotz and Scholz (2003)**)
    - ▶ Distort earnings (**Chetty et al 2013**).
    - ▶  $1 + FE(y) \approx 1.14$  for low-earners (calculation in Hendren 2013)
  - ▶ Taxing top incomes causes:
    - ▶ Reduction in taxable income (review in **Saez et al 2012**)
    - ▶ Implies  $1 + FE(y) \approx 0.50 - 0.75$
    - ▶ Disagreement about amount, but general agreement on the sign:  $FE(y) < 0$
- ▶ Reduced form empirical evidence suggests should put more weight on surplus to poor
  - ▶ Despite evidence that taxable income elasticities may be quite stable across the income distribution (e.g. Chetty 2012)

## A More Precise Representation

- ▶ Use optimal tax approach to write  $FE(y)$  as function of taxable income elasticities
- ▶ Let

$\epsilon^c(y) = \text{avg comp. elasticity for those earning } y$

$\zeta(y) = \text{avg inc. effect for those earning } y$

$\epsilon^P(y) = \text{avg LFP rate elasticity for those earning } y$

## Optimal Tax Expression

For every point,  $y^*$ , such that  $T'(y)$  and  $\epsilon^c(y^*)$  are locally constant and the distribution of income is continuous:

$$FE(y^*) = \underbrace{-\epsilon^P(y^*) \frac{T(y) - T(0)}{y - T(y)}}_{\text{Participation Effect}} - \underbrace{\zeta(y^*) \frac{\tau(y^*)}{1 - \frac{T(y^*)}{y^*}}}_{\text{Income Effect}} - \underbrace{\epsilon^c(y^*) \frac{\tau(y^*)}{1 - \tau(y^*)} \alpha(y^*)}_{\text{Substitution Effect}}$$

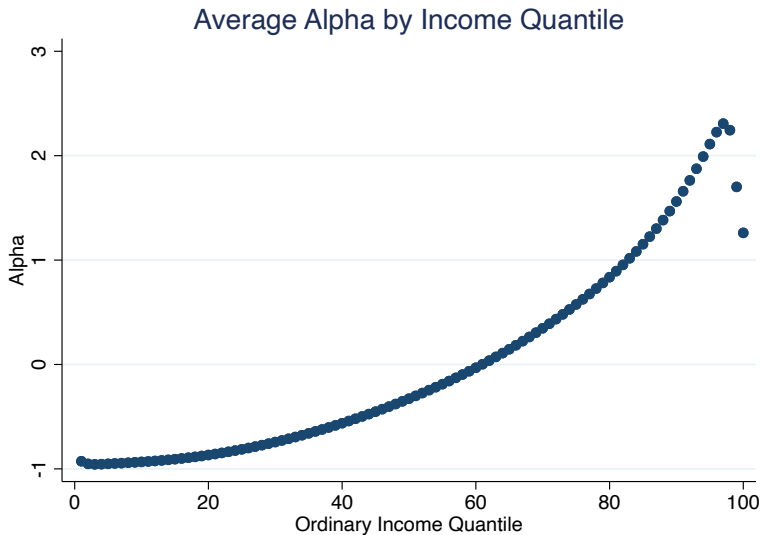
where  $\alpha(y) = -\left(1 + \frac{yf'(y)}{f(y)}\right)$  is the local Pareto parameter of the income distribution

- ▶ Heterogeneity in  $FE(y)$  depends on:
  1. Shape of income distribution,  $\alpha(y)$
  2. Shape and size of behavioral elasticities
  3. Shape of tax rates
- ▶ See derivation in Bourguignon and Spadaro (2012), Zoutman (2013a, 2013b), and Hendren (2014)

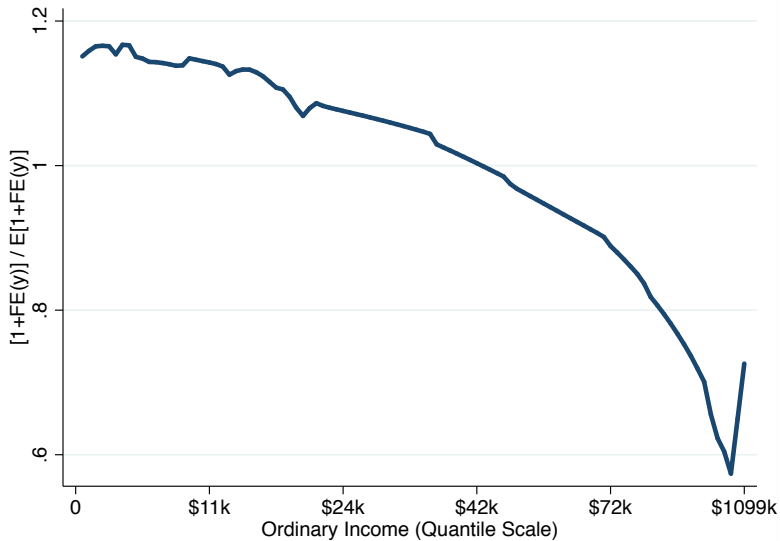
## Estimation Approach in US (Hendren, 2014)

- ▶ Calibrate behavioral elasticities from existing literature on taxable income elasticities
  - ▶ Assess robustness to range of estimates (e.g. compensated elasticity of 0.1, 0.3, and 0.5)
- ▶ Estimate shape of income distribution and marginal income tax rate using universe of US income tax returns
  - ▶ Account for covariance between elasticity of income distribution and marginal tax rate

# Average Alpha



## Shape of $1+FE(y)$



## Example: Producer versus Consumer Surplus

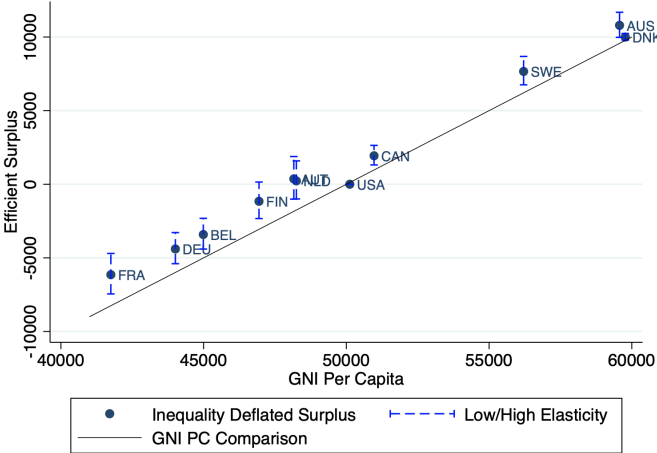
- ▶ Suppose budget neutral policy with benefits to producers  $S^P$  and consumers  $S^C$ 
  - ▶ Extreme assumption: producer surplus falls to top 1%
  - ▶ Consumer surplus falls evenly across income distribution
- ▶ Optimal weighting:

$$S^{ID} = 0.77S^P + S^C$$

- ▶ “Consumer surplus standard” requires top tax rate near Laffer curve
  - ▶ France should have tighter merger regulations?
- ▶ Key assumption: policy is budget neutral (inclusive of fiscal externalities)

# Example: Economic Growth

Figure 10: Comparisons of Income Distributions Across Countries



## Targeted Non-Budget Neutral Policies

- ▶ Suppose  $G$  affects those with income  $y$
- ▶ Construct

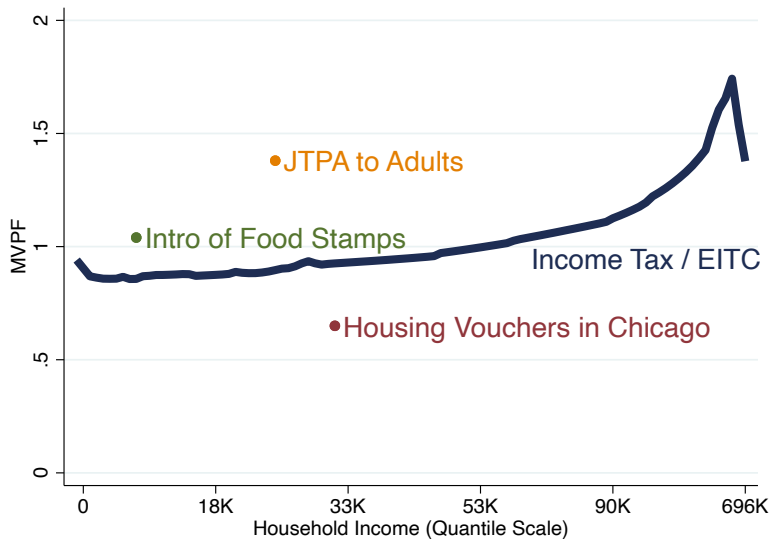
$$MVPF_G = \frac{s(y)}{1 + FE^G}$$

- ▶ Depends on causal effects ( $FE^G$ ) and WTP for non-market good
- ▶ Additional spending on  $G$  desirable iff

$$\underbrace{MVPF_G}_{\text{Value of } G} \geq \underbrace{\frac{1}{1 + FE(y)}}_{\text{Value of } T(y)}$$

- ▶ Compare value of spending to value of equivalent tax cut to similar people

# Welfare Impact



## Two reasons to use these weights...

- ▶ Logic: Compare the value of the policy to a tax cut with similar distributional incidence
  - ▶ Can augment policy with benefit tax to make Pareto improvement
    - ▶ Prefer the policy by the (potential) Pareto principle
- ▶ Rationales not to use these weights?
  - ▶ e.g. Political economy constraints on redistribution? Others?

# Inverse Optimum Approach

- ▶ Up to now,  $1 + FE(y)$  is the **cost** of taxation
  - ▶ Not necessarily a normative value aside from being able to search for potential Pareto improvements
- ▶ But, can also have a normative interpretation
  - ▶ Reveals the social preferences of whoever set the tax schedule
  - ▶ “Inverts” the optimal tax idea covered in detail in 2450B

Optimal Tax: Social Preferences  $\implies$  Taxes

”Inverse-Optimal” Tax: Taxes  $\implies$  Social Preferences

# Inverse Optimum Derivation

- ▶ Social welfare:

$$W = \int v(\theta) \psi(\theta) d\mu(\theta)$$

- ▶ Define social welfare  $\hat{W}(y^*, \epsilon, \eta)$  to be social welfare under  $\hat{T}(y; y^*, \epsilon, \eta)$
- ▶ Let  $v(\theta)$  denote the social marginal utility of income for type  $\theta$ :

$$v(\theta) = \frac{dW}{dy_\theta} = \lambda(\theta) \psi(\theta)$$

where  $\lambda$  is the individual's marginal utility of income

- ▶ So,  $v$  is the impact on social welfare of giving type  $\theta$  an additional \$1.
  - ▶ Ratios of  $v$  are Okun's bucket

$$\frac{v(\theta_1)}{v(\theta_2)} = 2$$

implies indifferent to \$1 to type  $\theta_1$  relative to \$2 to type  $\theta_2$

## Inverse Optimum Derivation

- ▶ For a given  $y^*$ , what is the welfare impact of increasing transfers to those earning near  $y$  by  $\eta$ ?
- ▶ Use envelope theorem:
  - ▶ Marginal welfare impact given by mechanical loss in income weighted by social marginal utility of income:

$$\frac{dW}{d\eta} \Big|_{\eta=0} = \int v(\theta) \mathbb{1} \left\{ y \in \left( y^* - \frac{\epsilon}{2}, y^* + \frac{\epsilon}{2} \right) \right\} d\mu(\theta)$$

- ▶ Note: Assumes partial equilibrium
- ▶ So, a localized tax cut yields welfare:

$$\lim_{\epsilon \rightarrow 0} \frac{dW}{d\eta} \Big|_{\eta=0} = E[v(\theta) | y(\theta) = y^*]$$

or, the average marginal utilities of income for those earning  $y^*$

## Inverse Optimum Derivation

- ▶ Government is indifferent to tax changes if and only if

$$E [v (\theta) | y (\theta) = y^*] = 1 + FE (y^*) \quad \forall y^*$$

- ▶ Exercise: Show this is equivalent to equating all MVPFs associated with tax changes to each other
- ▶ Common simplifying assumption: Unidimensional heterogeneity:

$$E [v (\theta) | y (\theta) = y] = v (y)$$

- ▶ Otherwise reveals average social marginal utilities of income conditional on income

## Inverse Optimum Implementation

- ▶ Implement using common elasticity representation
  - ▶ Assume convex preferences (no participation responses) and no income effects
- ▶ Recall that if  $\tau(y)$  is linear then

$$g(y^*) = 1 + \epsilon \frac{\tau(y)}{1 - \tau(y)} \frac{d}{dy} \Big|_{y=y^*} \left[ y \frac{f(y)}{f(y^*)} \right]$$

where  $\frac{d}{dy} \Big|_{y=y^*} \left[ y \frac{f(y)}{f(y^*)} \right] = - \left( 1 + \frac{y^* f'(y^*)}{f(y^*)} \right)$  is the local Pareto parameter of the income distribution

- ▶ But, if  $\tau$  is nonlinear, this generalizes to:

$$g(y^*) = 1 + \epsilon \frac{d}{dy} \Big|_{y=y^*} \left[ \frac{\tau(y)}{1 - \tau(y)} y \frac{f(y)}{f(y^*)} \right]$$

or

$$\frac{g(y^*) - 1}{\epsilon} f(y^*) = \frac{d}{dy} \Big|_{y=y^*} \left[ \frac{\tau(y)}{1 - \tau(y)} y f(y) \right]$$

# Inverse Optimum Implementation

- ▶ Use Fundamental Thm of Calculus:

$$\left[ \lim_{\tilde{y} \rightarrow \infty} \frac{\tau(y)}{1 - \tau(y)} \frac{yf(y)}{f(y^*)} \right] - \frac{\tau(y)}{1 - \tau(y)} yf(y) = \int_y^\infty \frac{g(\tilde{y}) - 1}{\epsilon} f(\tilde{y}) d\tilde{y}$$

- ▶ Generally,  $\lim_{\tilde{y} \rightarrow \infty} \frac{\tau(y)}{1 - \tau(y)} \frac{yf(y)}{f(y^*)} = 0$  (e.g. if  $f$  is pareto,  $f \propto y^{-\alpha-1}$ )

- ▶ So

$$\frac{\tau(y)}{1 - \tau(y)} yf(y) = \int_y^\infty \frac{1 - g(\tilde{y})}{\epsilon} f(\tilde{y}) d\tilde{y}$$

## Inverse Optimum Implementation

- Implies basic Mirrlees formula (Diamond and Saez JEP 2011):

$$\frac{\tau(y)}{1 - \tau(y)} \alpha(y) \epsilon(y) = 1 - G(y)$$

where

$$G(y) = \frac{1}{1 - F(y)} \int_y^{\infty} g(\tilde{y}) f(\tilde{y}) d\tilde{y}$$

is the average social marginal utilities on those earning more than  $y$

$$\alpha(y) = \frac{yf(y)}{1 - F(y)}$$

is the local Pareto parameter of the income distribution

# Inverse Optimum Implementation

- ▶ Growing literature estimating inverse optimum solutions in many settings
  - ▶ Bourguignon and Spadaro (2012), Jacobs, Jongen, and Zoutman (2013; 2014), Lockwood and Weinzierl (2014),
- ▶ Key inputs:
  - ▶ Tax schedule,  $\tau(y)$
  - ▶ Shape of income distribution,  $\alpha(y)$
  - ▶ Taxable income elasticity,  $\epsilon(y)$
- ▶ Key Assumptions
  - ▶ constant elasticity (consensus that  $\epsilon = 0.5$ ?)
  - ▶ no other responses (e.g. participation)

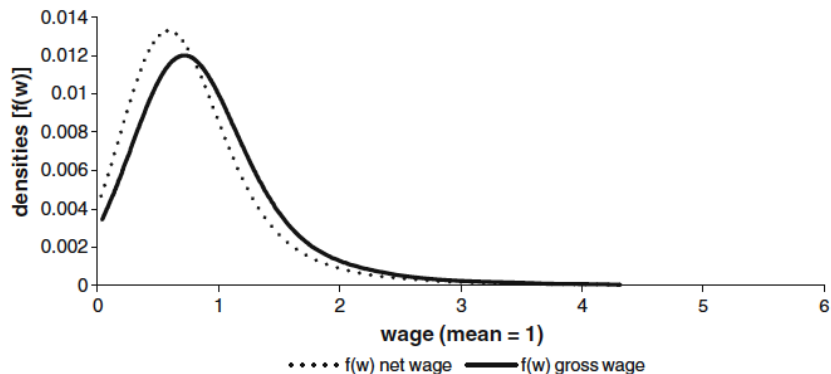
# Inverse Optimum Implementation

- ▶ Question: Is  $\epsilon(y)$  identified by the causal effect of tax changes?

## Bourguignon and Spadaro (2012)

- ▶ Bourguignon and Spadaro (2012) were one of the first to empirically implement the inverse optimum approach
- ▶ Use survey data in France
- ▶ Use wages as  $y$ 
  - ▶ Problems with this?
  - ▶ Recall: Census/survey data vs. tax data...Piketty and Saez (2003)

# Bourguignon and Spadaro (2012)



**Fig. 2** Kernel wage densities for singles: net and gross scenario

## Bourguignon and Spadaro (2012)

- ▶ Problem: tax rates vary conditional on wage
- ▶ Ideally, estimate tax rate separately using tax data
  - ▶ Then aggregate the fiscal externality (see Hendren 2016)
- ▶ Solution in survey data: smooth it...

# Bourguignon and Spadaro (2012)

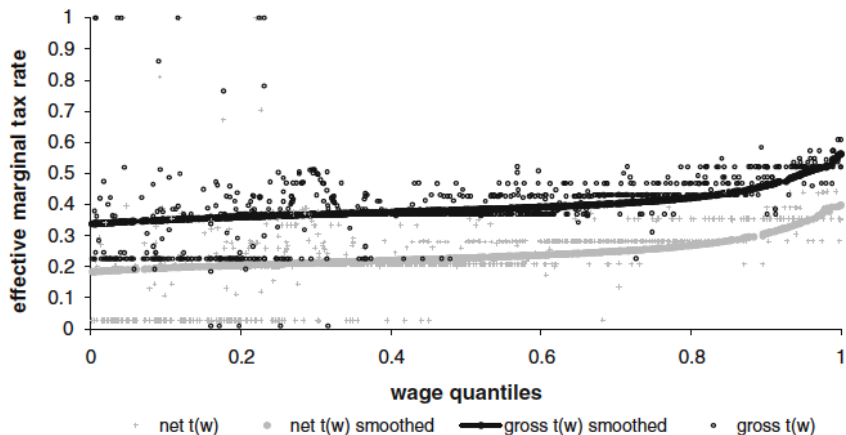


Fig. 1 Kernel smoothed marginal tax rates for singles: net and gross scenarios

## Bourguignon and Spadaro (2012)

- ▶ Finally, need elasticity of taxable income
- ▶ Use range of elasticities between 0.1 and 0.5

# Bourguignon and Spadaro (2012)

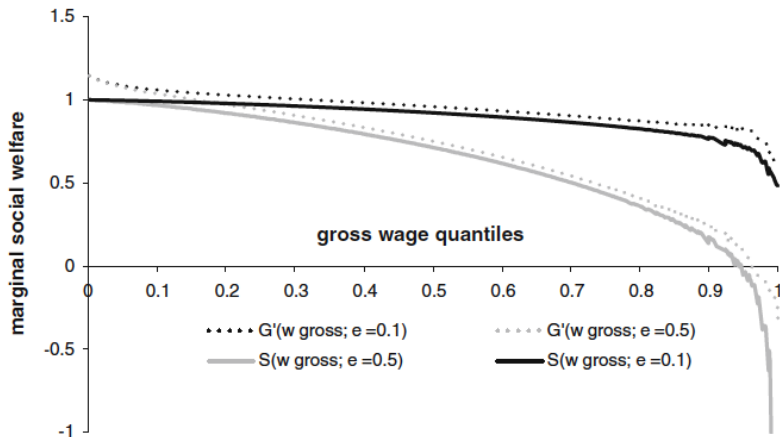


Fig. 4 Social marginal welfare for singles (on gross wages)

## Bourguignon and Spadaro (2012)

- ▶ Conclusion: If taxable income elasticity is 0.5, then taxes on the rich are too high:

$$FE(y) < -1$$

- ▶ Above the top of the laffer curve
- ▶ Potential limitations?
- ▶ Recall from optimal tax:
  - ▶ optimal for top tax rate to be zero unless we have thick upper tail of income distribution
- ▶ Nathan's take: result largely driven by thin tail of income distribution provided in survey data; unclear whether would hold in tax data

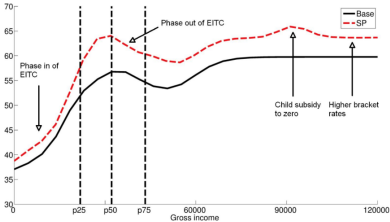
## Jacobs, Jongen, and Zoutman (2016)

- ▶ Jacobs, Jongen, and Zoutman (2016) “Redistributive Politics and the Tyranny of the Middle Class”
- ▶ Key idea: Use not only equilibrium tax rates, but proposed tax changes to estimate social preferences
  - ▶ Use data from Dutch political parties
- ▶ Map variations in tax policies,  $\tau^j(y)$ , into implied social welfare weights,  $G^j(y)$ 
  - ▶ Infer political preferences of parties

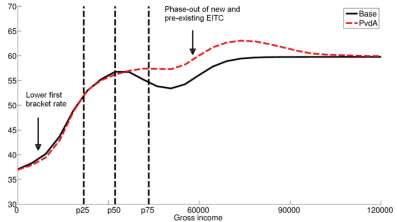
$$\frac{\tau^j(y)}{1 - \tau^j(y)} \alpha(y) \epsilon(y) = 1 - G^j(y)$$

where  $G^j$  is the implied social welfare weights on those earning more than  $y$

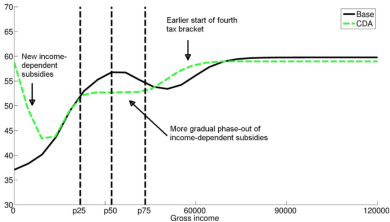
# Effective Marginal Tax Rates



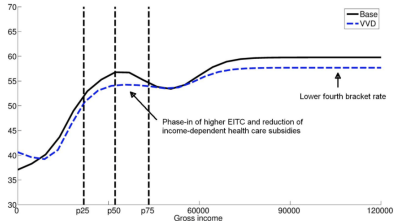
(a) Socialist Party (SP)



(b) Labor Party (PvdA)

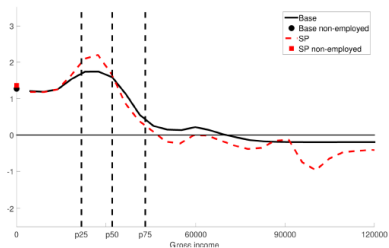


(c) Christian-Democratic Appeal (CDA)

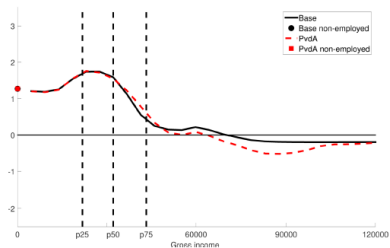


(d) People's Party for Freedom and Democr. (VVD)

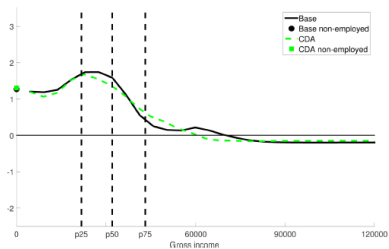
# Implied Social Preferences



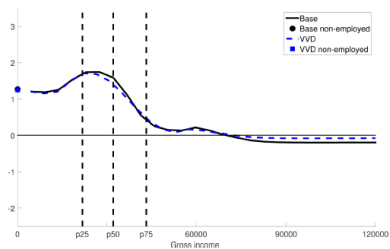
(a) Socialist Party (SP)



(b) Labor Party (PvdA)



(c) Christian-Democratic Appeal (CDA)



(d) People's Party for Freedom and Democr. (VVD)

## Jacobs, Jongen, and Zoutman (2016)

- ▶ Potential concerns:
  - ▶ Dynamics of policy responses
  - ▶ Changes in income distribution
  - ▶ Changes in taxable income elasticity
- ▶ General issue with “sufficient statistics”?

# Summary

- ▶ Redistribution isn't free
  - ▶ Empirical evidence suggests it is costly (cheap) to redistribute from rich to poor (poor to rich)
  - ▶ Policies targeted towards the poor “should” be inefficient relative to a world with lump-sum transfers
- ▶ But, accounting for distributional incidence requires estimating fiscal externalities
  - ▶ Taxable income elasticity is a tough empirical parameter...
  - ▶ And, still need to estimate MVPF of a policy (which requires estimating its fiscal externality too...)
- ▶ Can we reduce these requirements of estimating all these behavioral responses?
  - ▶ Next lecture!

# Heterogeneous Surplus

- ▶ What if policy affects different types conditional on income?
  - ▶ e.g. Medicaid affects the poor and sick; EITC affects the poor and healthy
  - ▶ And maybe there's a social preference for the sick conditional on income?
- ▶ Redistribution based on income, not individual-specific
  - ▶ Two people with same income,  $y(\theta)$ , can have different surplus,  $s(\theta)$
  - ▶ Income tax is a “blunt instrument”
  - ▶  $\int s(\theta) g(y(\theta)) =$  how much *on average* is each income level better off
    - ▶ Search for potential Pareto comparisons more difficult

# Heterogeneous Surplus

- ▶ Option 1: Still can search for potential Pareto improvements
- ▶ Define

$$\underline{S} = E [\min \{s(\theta) | y(\theta) = y\} g(y)] > 0$$

- ▶ Modified alternative environment delivers Pareto improvement iff  $\underline{S} > 0$
- ▶ Modified status quo offers Pareto improvement iff  $\bar{S} < 0$
- ▶ No potential Pareto ranking when  $\underline{S} < 0 < \bar{S}$
- ▶ Easier if surplus does not vary conditional on income, so that  $\underline{S} = S = \bar{S}$

## Generalization to multiple dimensions

- ▶ Option 2: Add more status quo policies
- ▶ Marginal cost  $1 + FE(\mathbf{X})$  as opposed to  $1 + FE(y)$ 
  - ▶ e.g. Transfers conditional on both income,  $y$ , and medical spending,  $m$ ;
  - ▶ Notation:  $\mathbf{X} = \{y, m\}$
- ▶ How do we construct  $FE(\mathbf{X})$ ?
- ▶ Construct  $FE(\mathbf{X}) = \lim_{\epsilon \rightarrow 0} FE(\mathbf{X}, \epsilon)$ , where  $FE(\mathbf{X}^*, \epsilon) = \frac{d}{d\eta} q(\mathbf{X}, \eta, \epsilon) - 1$  is the fiscal externality from giving a tax cut to those with values of  $\mathbf{X} \in N_\epsilon(\mathbf{X}^*)$ 
  - ▶  $q(\mathbf{X}, \eta, \epsilon)$  is government revenue when types within an  $\epsilon$ -neighborhood of  $\mathbf{X}$  obtain a tax cut of  $\eta$
- ▶ Then, test

$$\int [1 + FE(\mathbf{X})] s(\mathbf{X}) >? 0$$