Topic 2: Redistributive Concerns: Kaldor Hicks and the Inverse Optimum

Nathaniel Hendren

Harvard

Spring, 2023

Last Class

- Recall: Last class we motivated the MVPF for welfare analysis

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

- Provides 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 huts 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: Update 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

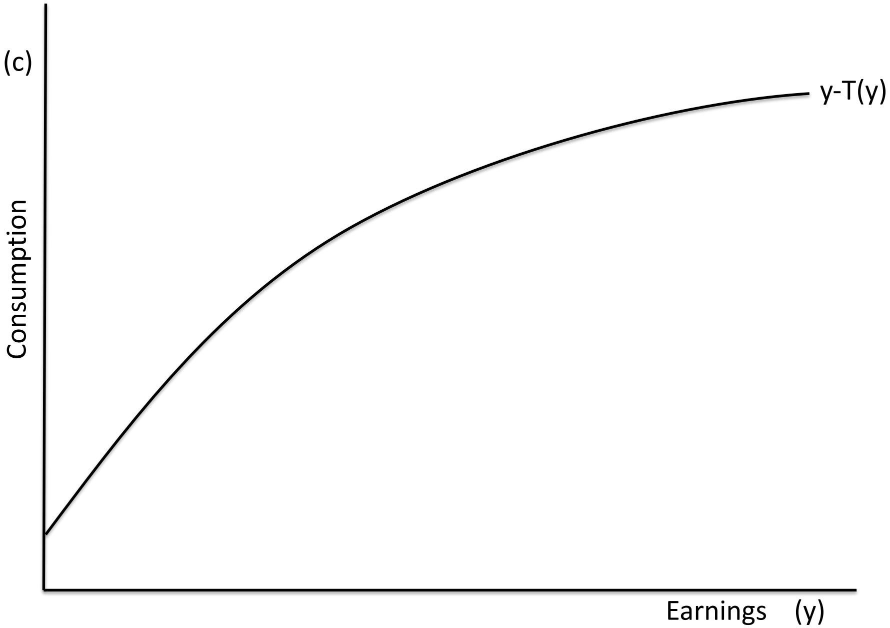
- Hicks (1939) writes:
  - *"If, as will often happen, the best methods of compensation feasible involve some loss in productive efficiency, this loss will have to be taken into account. (Hicks, 1939)*

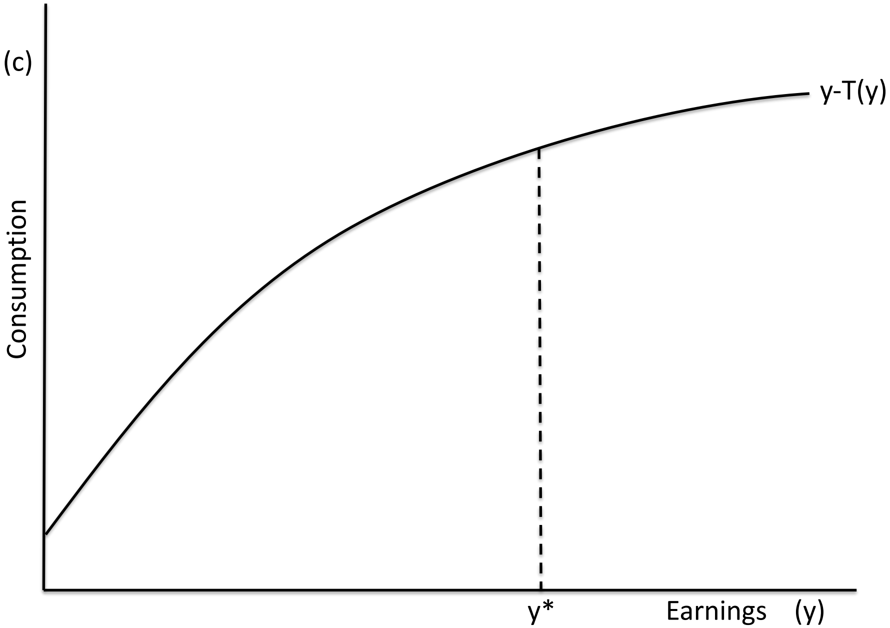
- Loosely follow mathematical models in Hendren (2020), "Measuring Economic Efficiency Using Inverse-Optimum Weights":
  - GE version in Tsyvinksi and Werquin (2019)

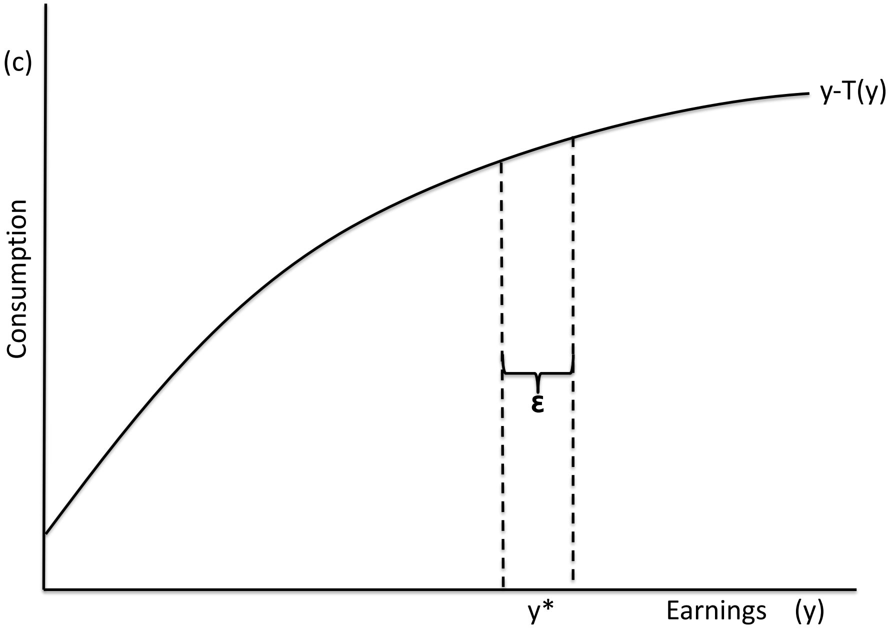
- Other key readings:
  - Main ideas first presented in Mirrlees (1976, JPUBEC) (A classic!)
  - Empirically implemented in inverse optimum literature (Bourguignon and Spadaro, 2012)
    - See also Hylland and Zeckhauser (1979), Coate (2000), Kaplow (1996, 2004, 2006, 2008)
  - Related to optimal income taxation (Mirrlees, 1971, Saez, 2001)

Exploiting the Envelope Theorem...

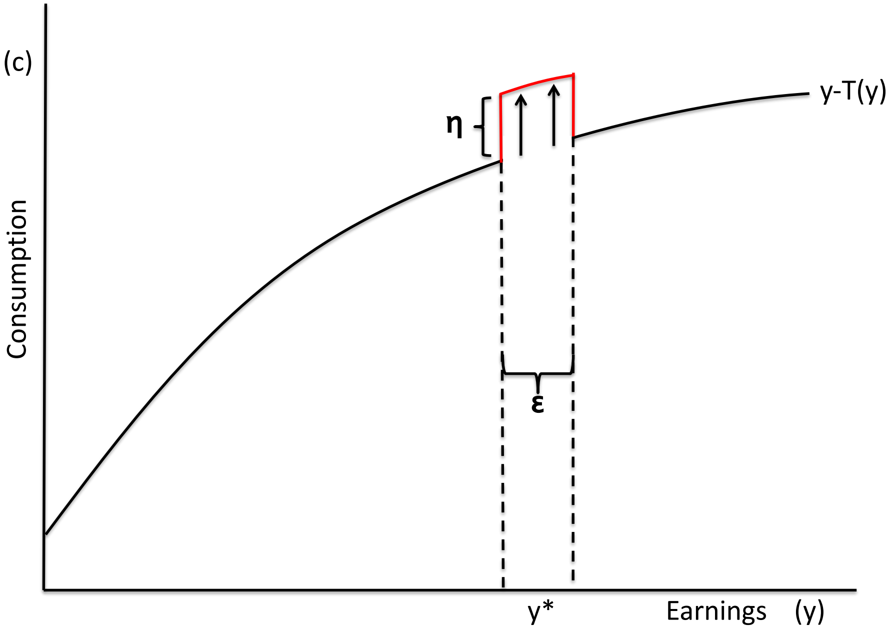
- Key idea: Envelope theorem allows for empirical method to account for distortions
  - Goal: turn unequal surplus into equal surplus using modifications to the tax schedule
    - Not individual-specific lump-sum transfers
  - Cost of moving $1 of surplus differs from $1 because of how behavioral response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


(c)
Consumption
y-T(y)
Earnings (y)

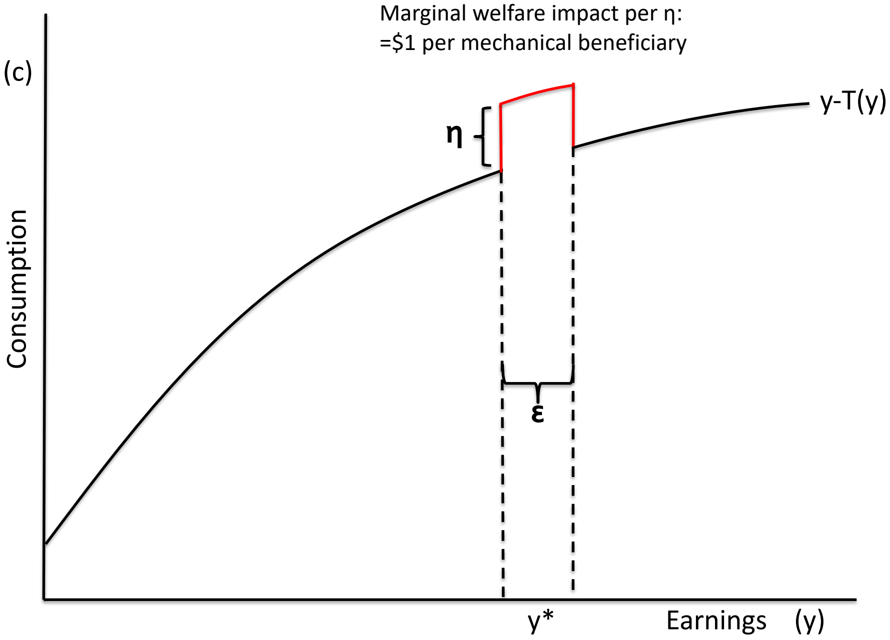

(c)
Consumption
y-T(y)
y*
Earnings (y)



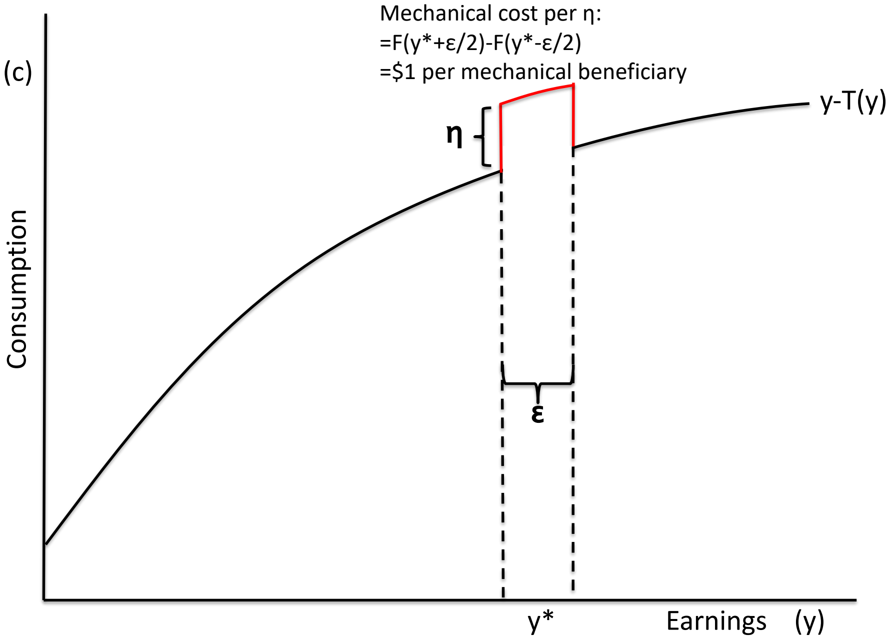
(c)
Consumption
y-T(y)
ε
y*
Earnings (y)

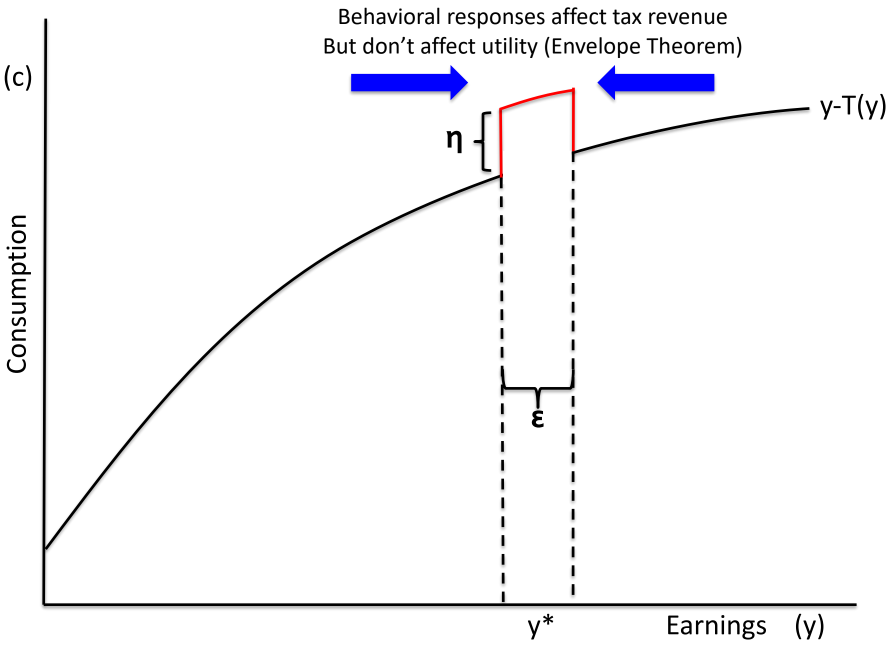


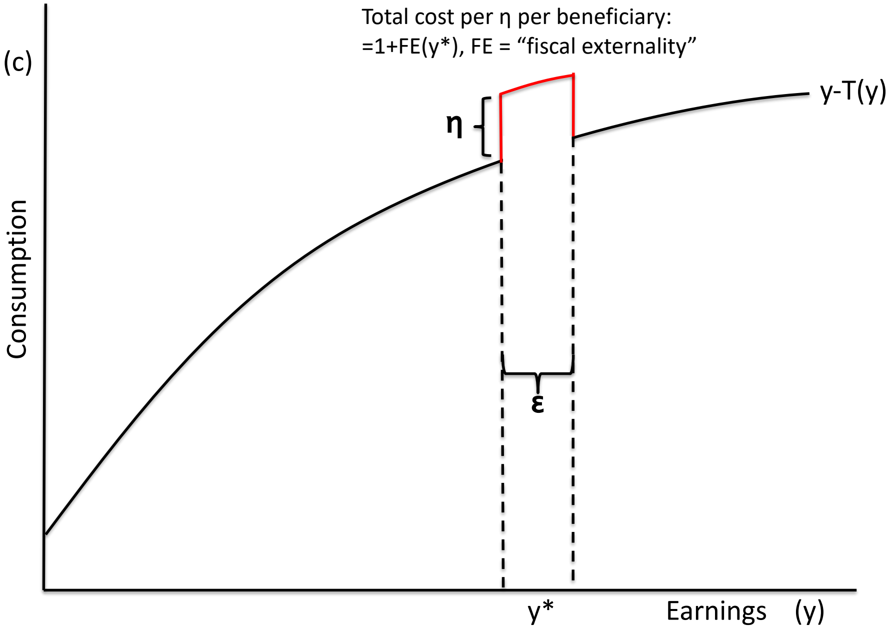
(c)
Consumption
η
y-T(y)
ε
y*
Earnings (y)



Marginal welfare impact per η:
=$1 per mechanical beneficiary
(c)
Consumption
η
ε
y-T(y)
y*
Earnings (y)


Mechanical cost per η:
=F(y*+ε/2)-F(y*-ε/2)
=$1 per mechanical beneficiary
(c)
η
y-T(y)
Consumption
ε
y*
Earnings (y)


Behavioral responses affect tax revenue
But don't affect utility (Envelope Theorem)
(c)
Consumption
η
ε
y-T(y)
y*
Earnings
(y)



Total cost per η per beneficiary:
=1+FE(y*), FE = “fiscal externality”
(c)
η
y-T(y)
Consumption
ε
y*
Earnings (y)

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

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

  - $\hat{T}$ provides η additional resources to an ϵ-region of individuals earning between $y^* - \epsilon/2$ and $y^* + \epsilon/2$.
- Given $\hat{T}$, individual of type θ 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 ϵ and η by

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

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

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

  (normalized by the number of mechanical beneficiaries).
  - Note $\hat{q}\left(y^{*},0,\eta\right)=\hat{q}\left(y^{*},\epsilon,0\right)=0$ for all ϵ and η
- Marginal cost of a tax cut to those earning near y:

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

- 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 $T(y) \to T(y) + \epsilon h(y)$
  - Let $s_\epsilon(y)$ denote individual y's WTP for the policy change. And, let $s(y) = \lim_{\epsilon \to 0} \frac{s_\epsilon(y)}{\epsilon}$ denote the individuals 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)

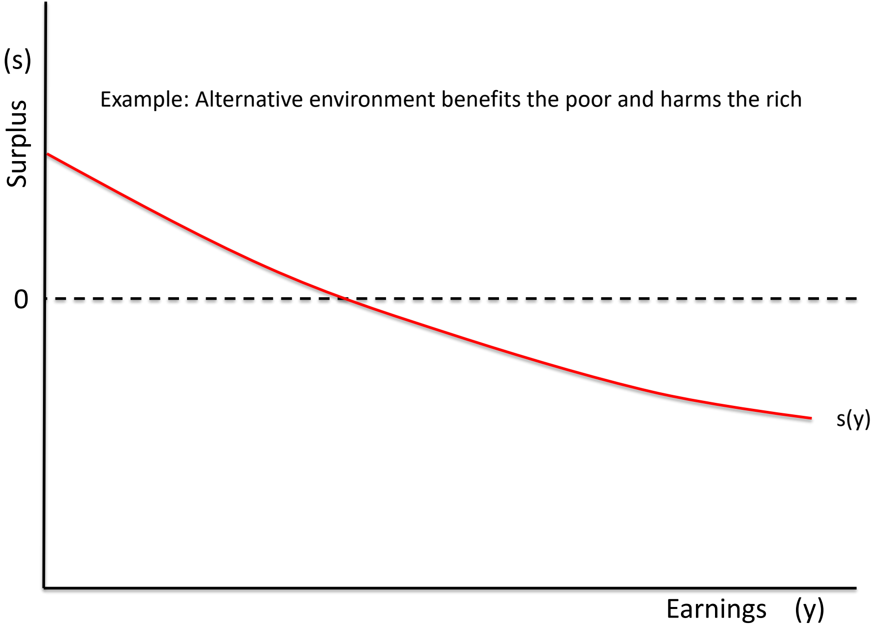
Welfare Analysis of Non-Tax Policies

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

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

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

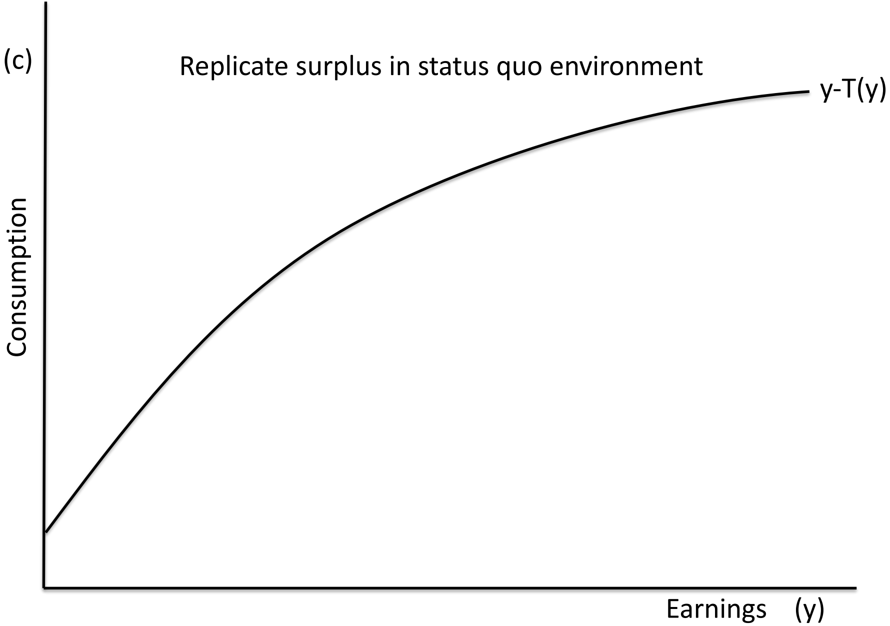
Example: Alternative Environment Benefits Poor



EV and CV

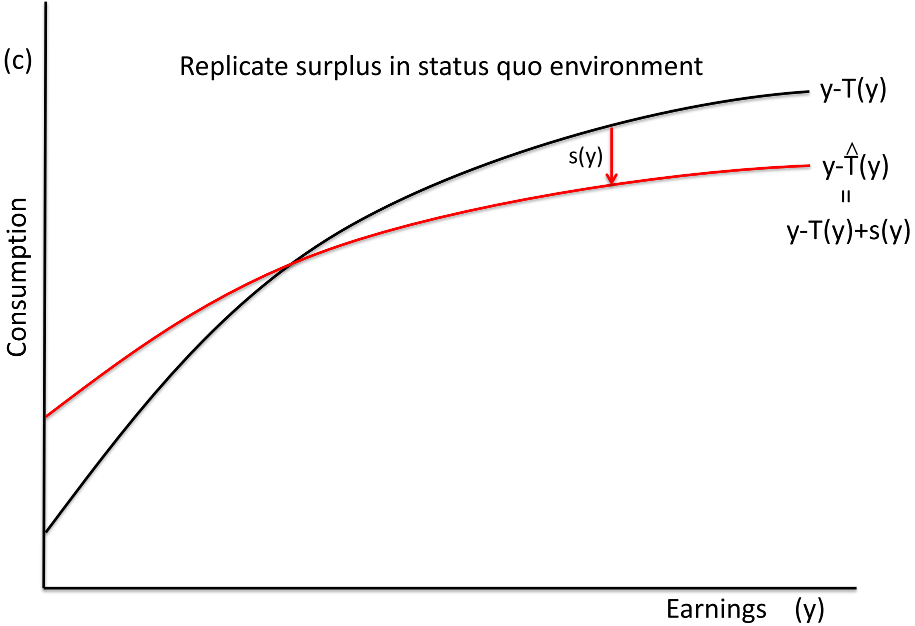
- Given $s(y)$, let's consider a modified policy that neutralizes distributional comparisons
- Two ways of neutralizing distributional comparisons: EV and CV
- "EV": modify status quo tax schedule
  - By how much can everyone be made better off in modified status quo world relative alternative environment?

"EV" Example

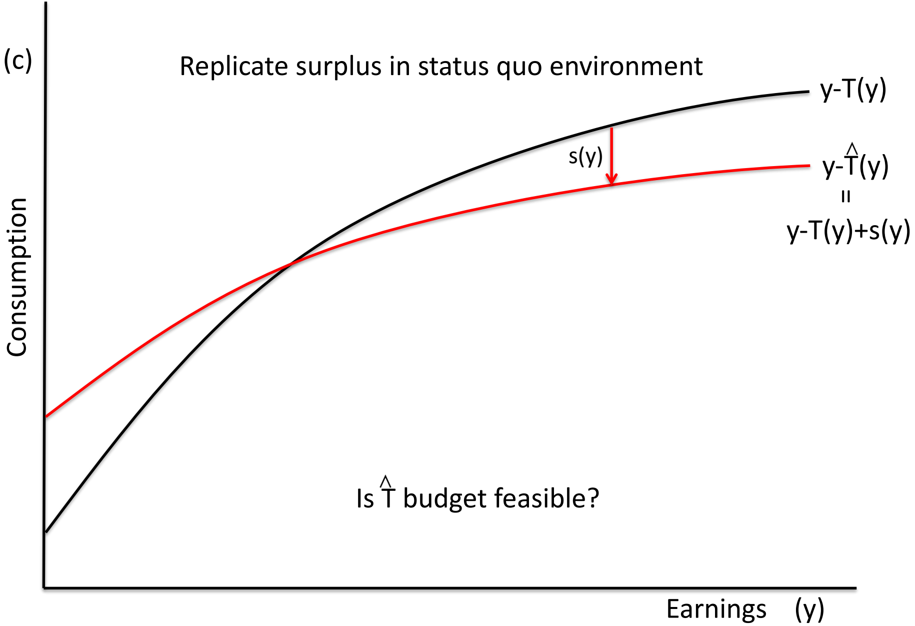


(c)
Consumption
Replicate surplus in status quo environment
y-T(y)
Earnings (y)

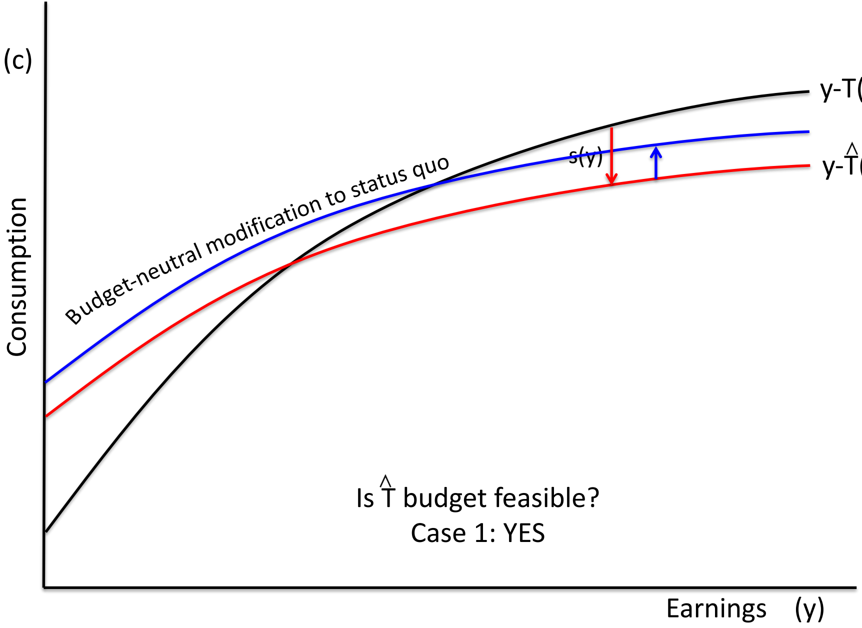
“EV” Example


(c)
Replicate surplus in status quo environment
y-T(y)
s(y)
y-T̂(y)
=
y-T(y)+s(y)
Consumption
Earnings (y)

"EV" Example

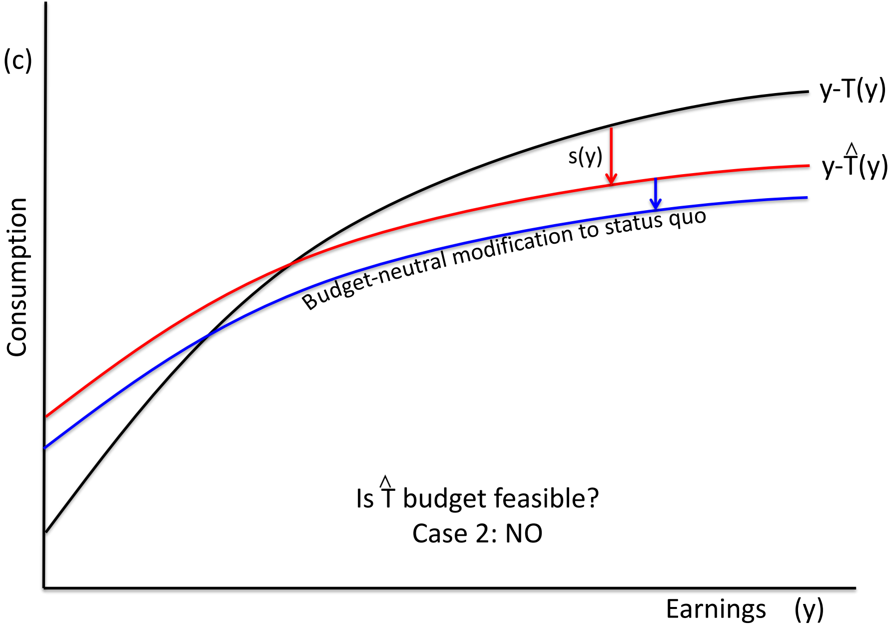

(c)
Replicate surplus in status quo environment
y-T(y)
s(y)
y-$\hat{T}$(y)
=
y-T(y)+s(y)
Consumption
Is $\hat{T}$ budget feasible?
Earnings (y)

“EV” Example

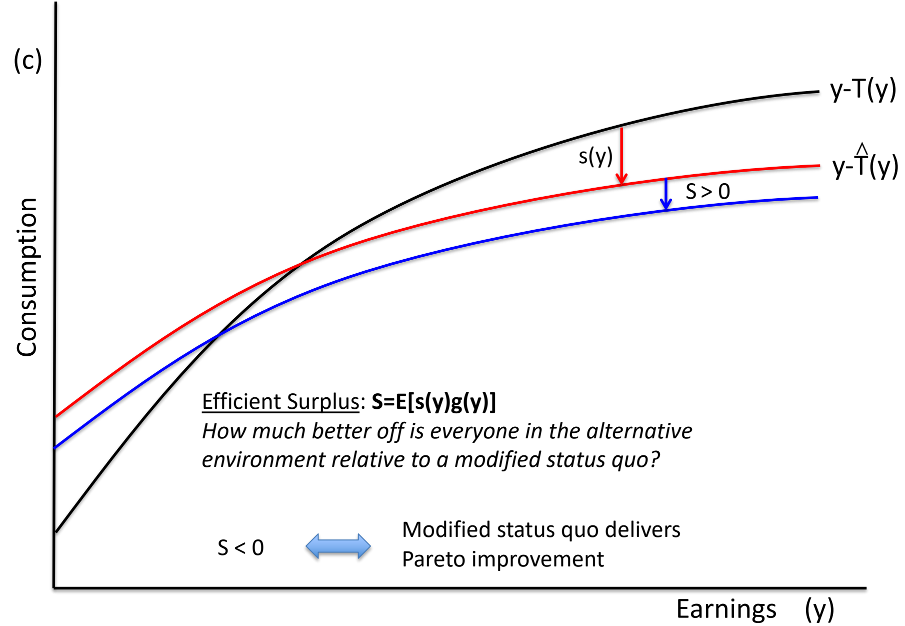


(c)
Consumption
Budget-neutral modification to status quo
s(y)
y-T(y)
y-$\hat{T}$(y)
Is $\hat{T}$ budget feasible?
Case 1: YES
Earnings (y)

“EV” Example


(c)
Consumption
y-T(y)
s(y)
y-$\hat{T}$(y)
Budget-neutral modification to status quo
Is $\hat{T}$ budget feasible?
Case 2: NO
Earnings (y)

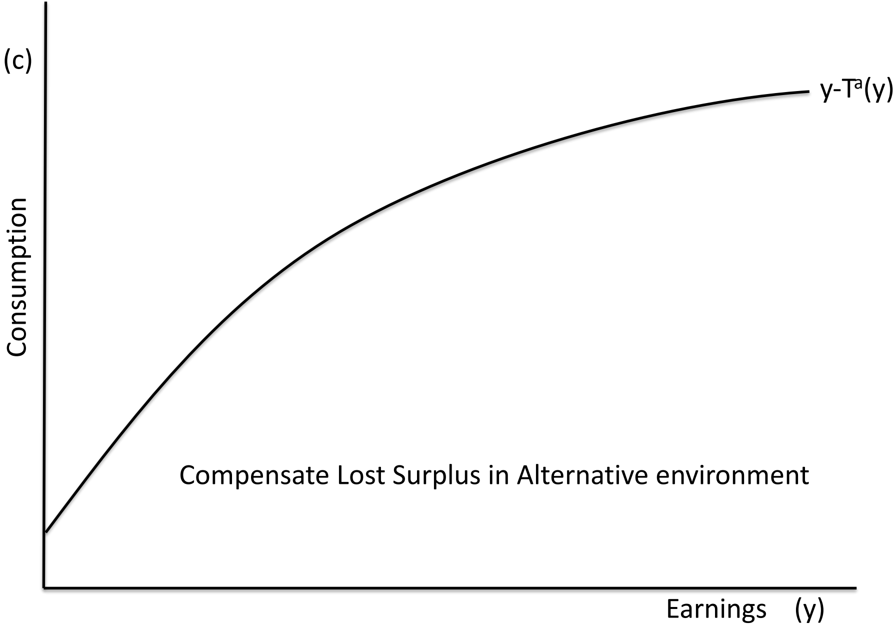
"EV" Example


(c)
Consumption
y-T(y)
s(y)
$y-\hat{T}(y)$
S > 0
Efficient Surplus: **S=E[s(y)g(y)]**
How much better off is everyone in the alternative environment relative to a modified status quo?
S < 0
Modified status quo delivers Pareto improvement
Earnings (y)

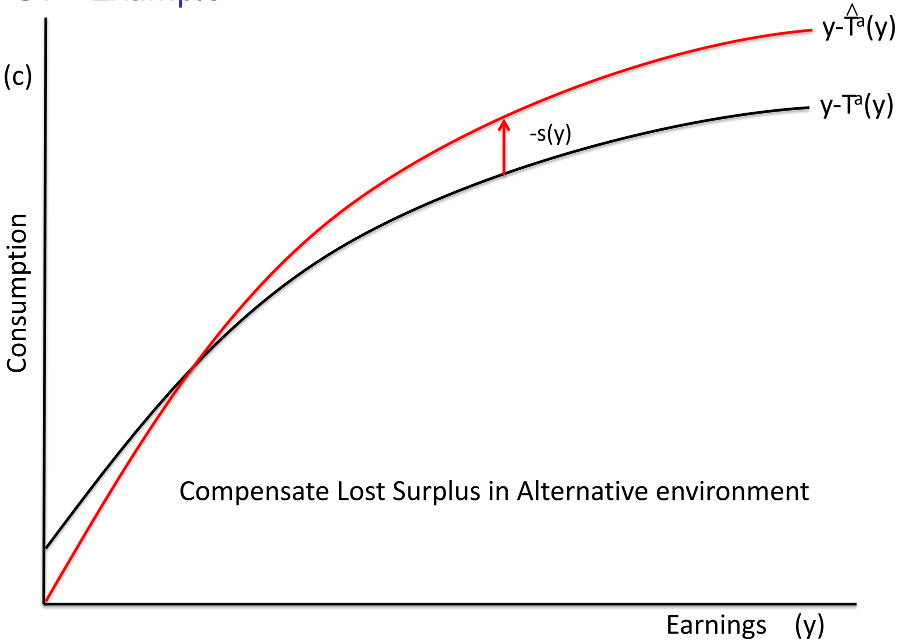
EV and CV

- 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

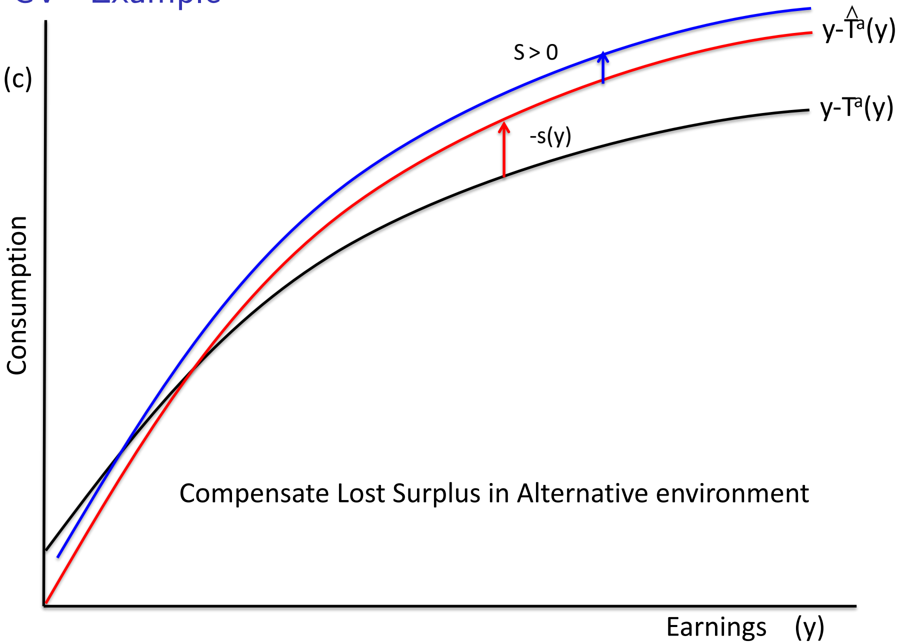

(c)
Consumption
y-T^a(y)
Compensate Lost Surplus in Alternative environment
Earnings (y)

"CV" Example



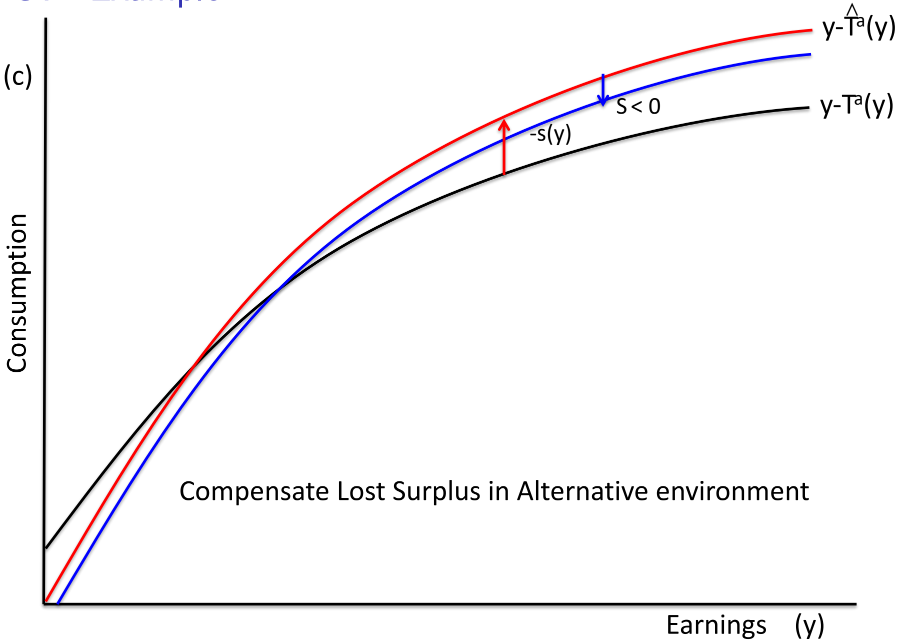
y-T̂a(y)
(c)
y-Ta(y)
-s(y)
Consumption
Compensate Lost Surplus in Alternative environment
Earnings (y)

"CV" Example



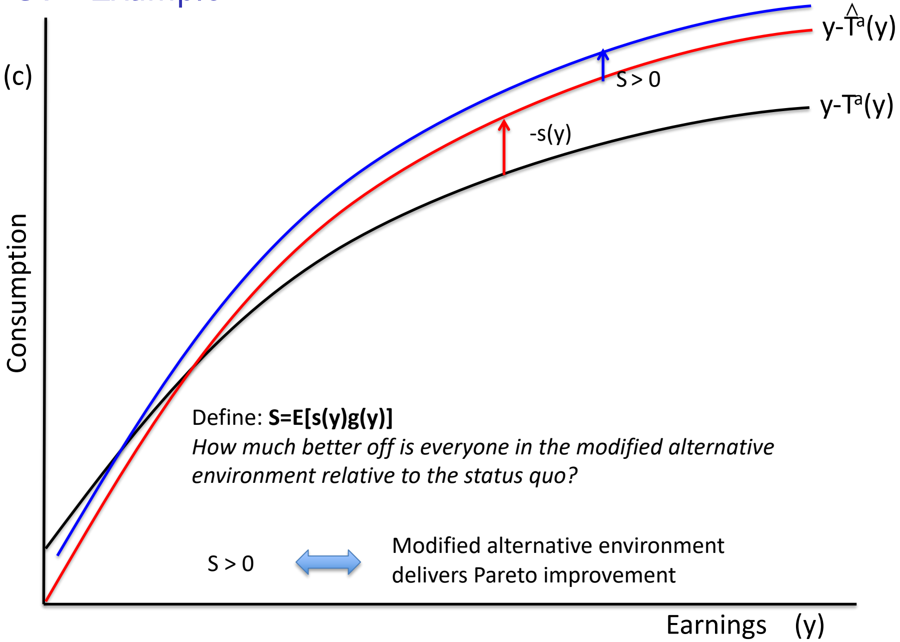
y-T̂a(y)
S > 0
(c)
y-Ta(y)
-s(y)
Consumption
Compensate Lost Surplus in Alternative environment
Earnings (y)

"CV" Example



y-T̂a(y)
(c)
S < 0
-s(y)
y-Ta(y)
Consumption
Compensate Lost Surplus in Alternative environment
Earnings (y)

“CV” Example



y-T̂a(y)
S > 0
y-Ta(y)
-s(y)
(c)
Consumption
Define: S=E[s(y)g(y)]
How much better off is everyone in the modified alternative environment relative to the status quo?
S > 0
Modified alternative environment delivers Pareto improvement
Earnings (y)

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

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

- 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:

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

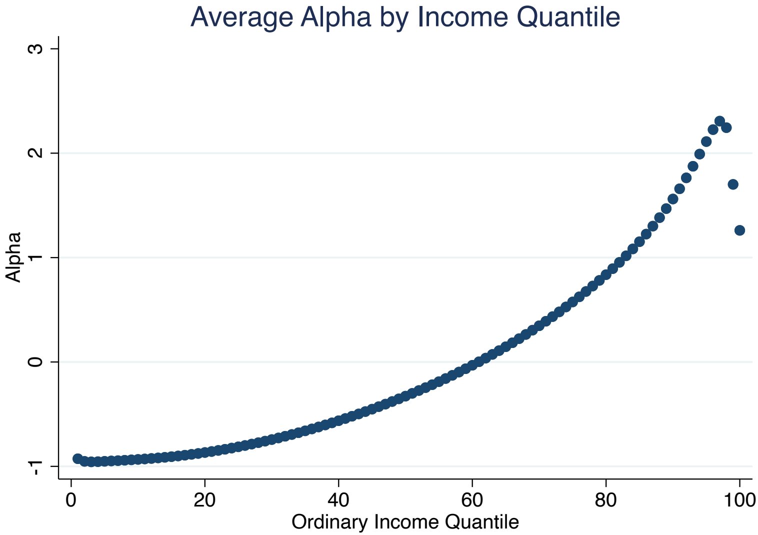
where $\alpha(y) = -\left(1+\frac{yf'(y)}{f(y)}\right)$ is the local Pareto parameter of the income distribution

- 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 (2020)

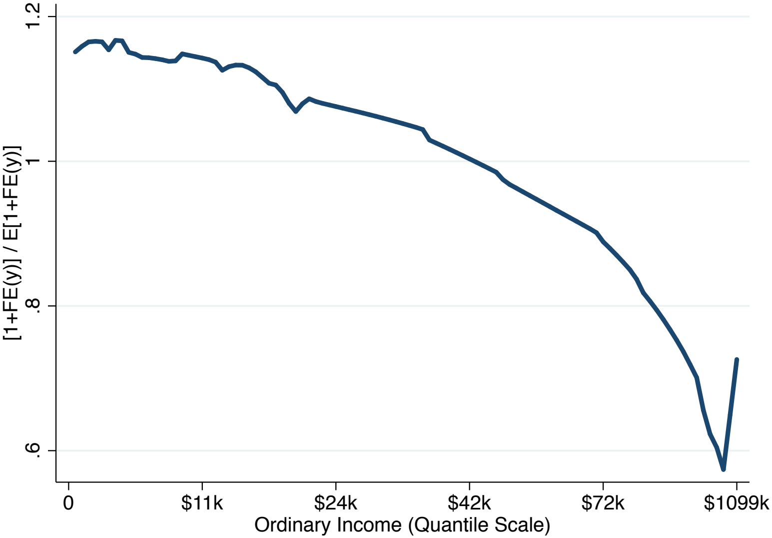
Estimation Approach in US (Hendren, 2020)

- 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

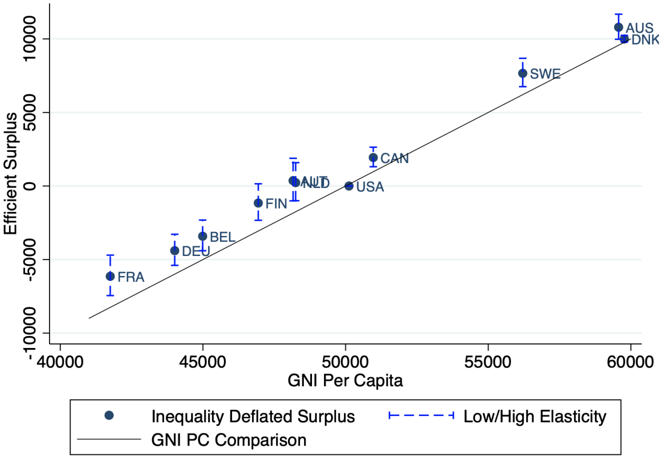
- Suppose budget neutral policy with benefits to producers S^P and consumers S^C
  - Extreme assumption: producer surplus falls to top 1%
  - Consumer surplus falls evenly across income distribution
- Optimal weighting:

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

- "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

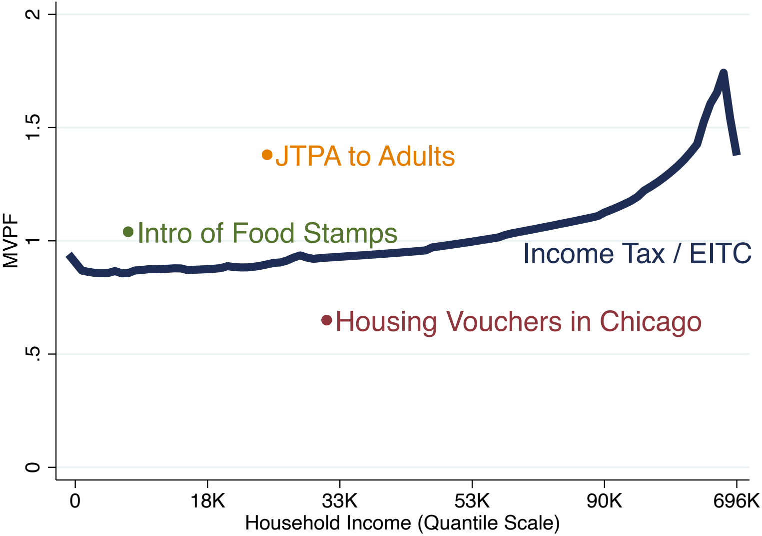
$$MVPF_G = \frac{s(y)}{1 + FE^G}$$

  - 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
  - $$\text{Optimal Tax: Social Preferences} \implies \text{Taxes}$$
    $$\text{"Inverse-Optimal" Tax: Taxes} \implies \text{Social Preferences}$$

Inverse Optimum Derivation

- Social welfare:

$$W = \int \psi(\theta)\, u(\theta)\, d\mu(\theta)$$

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

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

  where λ is the individual's marginal utility of income
- So, ν is the impact on social welfare of giving type θ an additional \$1.
  - Ratios of ν are Okun's bucket

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

    implies indifferent to \$1 to type θ_1 relative to \$2 to type θ_2

Inverse Optimum Derivation

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

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

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

$$\lim_{\epsilon \to 0} \frac{dW}{d\eta}|_{\eta=0} = E\left[\nu(\theta) | y(\theta) = y^*\right]$$

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

Inverse Optimum Derivation

- Government is indifferent to tax changes if and only if

$$E\left[\nu\left(\theta\right)\left|y\left(\theta\right)=y^{*}\right.\right]=1+FE\left(y^{*}\right)\quad\forall y^{*}$$

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

$$E\left[\nu\left(\theta\right)\left|y\left(\theta\right)=y\right.\right]=\nu\left(y\right)$$

  - 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

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

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

- But, if τ is nonlinear, this generalizes to:

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

or

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

Inverse Optimum Implementation

- Use Fundamental Thm of Calculus:

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

- Generally, $\lim_{\tilde{y}\to\infty} \frac{\tau(y)}{1-\tau(y)} \frac{yf(y)}{f(y^*)} = 0$ (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

- 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 Spadardo (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)

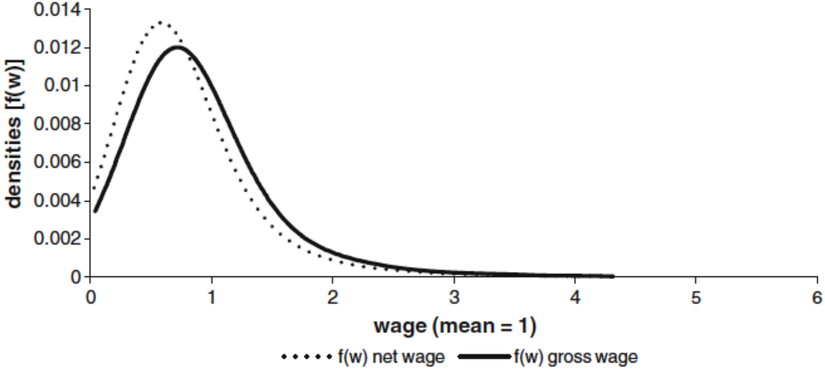


Fig. 2 Kernel wage densities for singles: net and gross scenario

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)

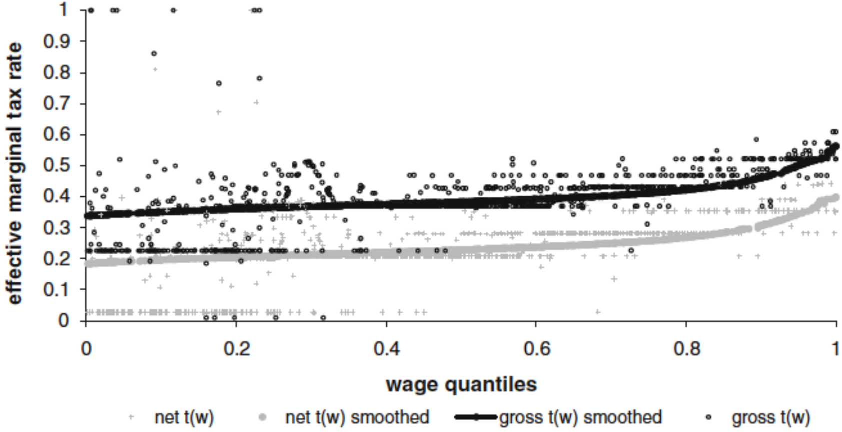


Fig. 1 Kernel smoothed marginal tax rates for singles: net and gross scenarios

Bourguignon and Spadaro (2012)

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

Bourguignon and Spadaro (2012)

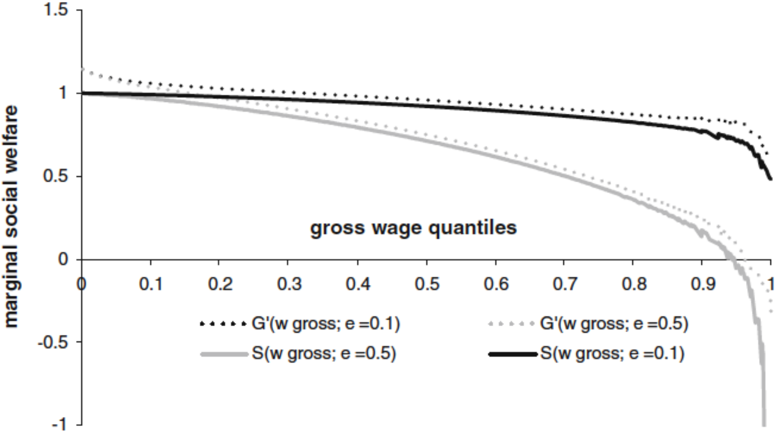


Fig. 4 Social marginal welfare for singles (on gross wages)

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

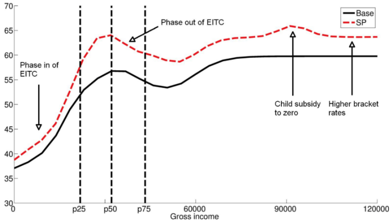
Jacobs, Jongen, and Zoutman (2016)

- 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

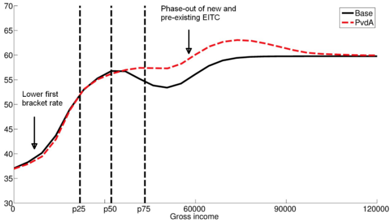
$$\frac{\tau^j(y)}{1-\tau^j(y)}\alpha(y)\epsilon(y) = 1 - G^j(y)$$

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

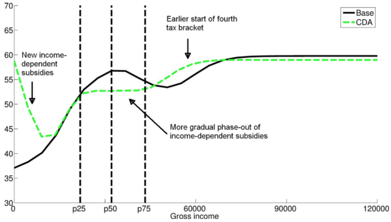
Effective Marginal Tax Rates



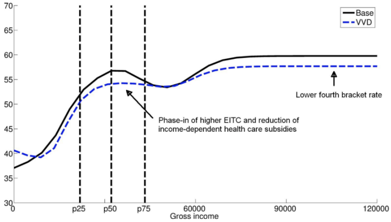
(a) Socialist Party (SP)



(b) Labor Party (PvdA)

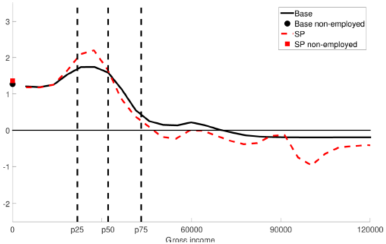


(c) Christian-Democratic Appeal (CDA)

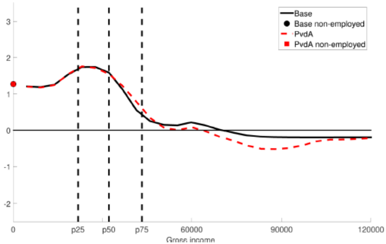


(d) People's Party for Freedom and Democr. (VVD)

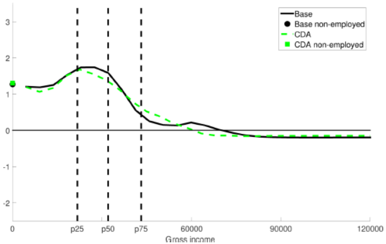
Implied Social Preferences



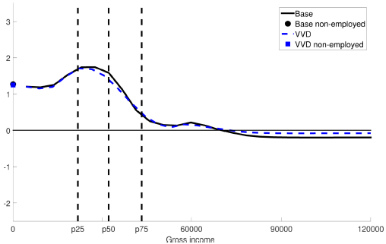
(a) Socialist Party (SP)



(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

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

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

Generalization to multiple dimensions

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

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