SSSI Part 1: The Social Cost of Inequality

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Motivation

- Inequality generates need for interpersonal comparisons
  - Decisions about economic policies (R&D, free trade, mergers, safety net, health, education, taxation, etc.)
  - General measurement of societal well-being
- Two common economic methods for resolving interpersonal comparisons
  1. Kaldor Hicks Compensation Principle (Kaldor (1939), Hicks (1939, 1940))
     - Motivates aggregate surplus, or "efficiency", as normative criteria
     - Ignores issues of "equity"
  2. Social welfare function (Bergson (1938), Samuelson (1947), Diamond and Mirrlees (1971), Saez and Stantcheva (2015))
     - Allows preference for equity
     - Subjective choice of researcher or policy-maker

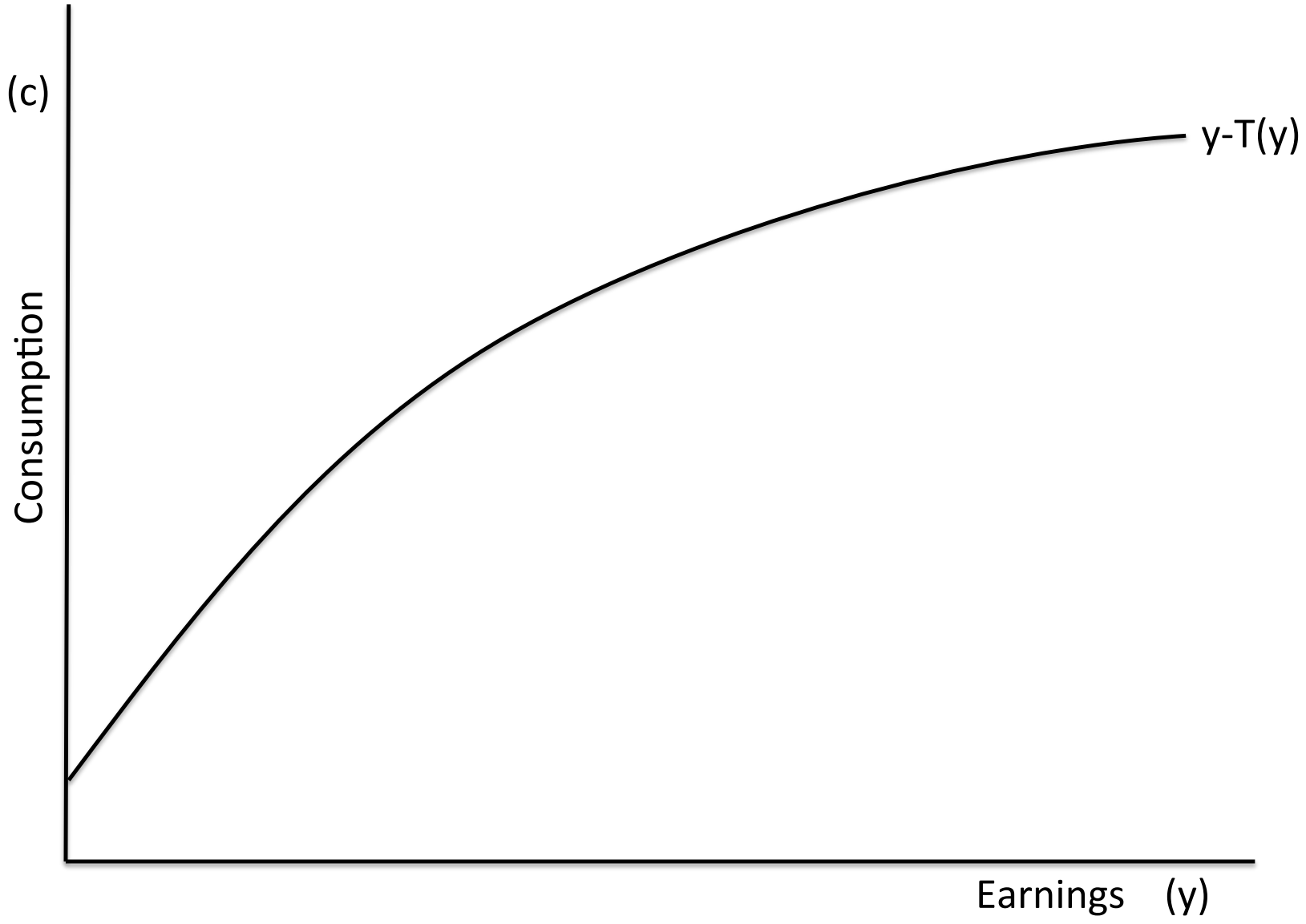
This Lecture

- Follow Hendren (2014) "The Inequality Deflator: Interpersonal Comparisons without a Social Welfare Function"
- Revisit Kaldor-Hicks
- Modify so that transfers are incentive compatible (Mirrlees (1971))
- Kaldor and Hicks envisioned feasible transfers:
  - *"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)*
    - Existing literature: Hylland and Zeckhauser (1979), Coate (2000), Kaplow (1996, 2004, 2006, 2008)
- Provide simple (yet general) empirical method of accounting for these distortions

This Lecture

- Key idea: Envelope theorem allows for empirical method to account for distortions
  - Corresponds to weighting surplus by the "inequality deflator"
  - Turns unequal surplus into equal surplus using modifications to the tax schedule
- Inequality deflator is the marginal cost to government of providing \$1 of welfare to an income level
  - Differs from \$1 because of how behavioral response affects government budget (basic PF logic)
- Suppose we want to provide transfers to those earning near y^*

Modifications to Income Tax Schedule



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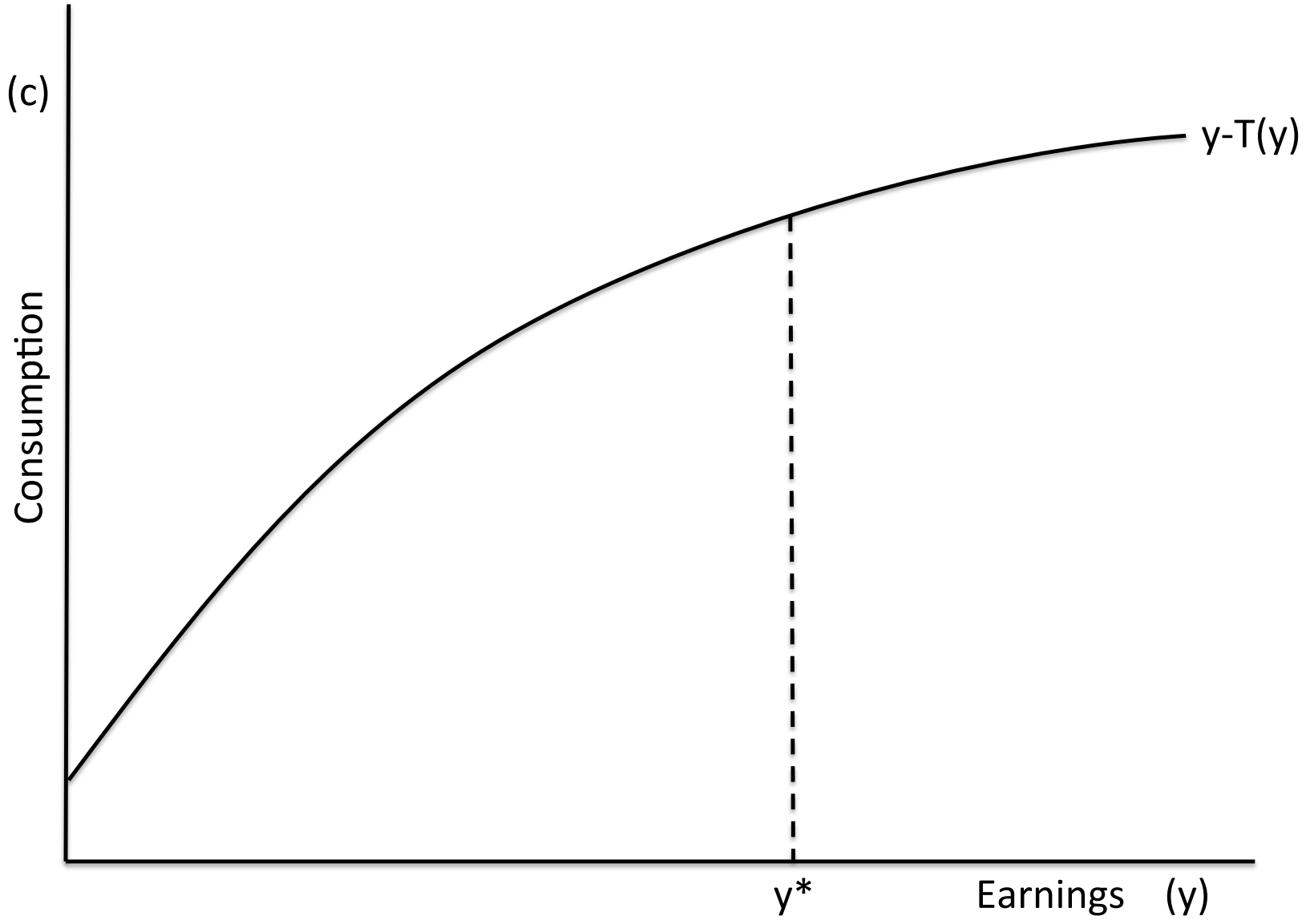

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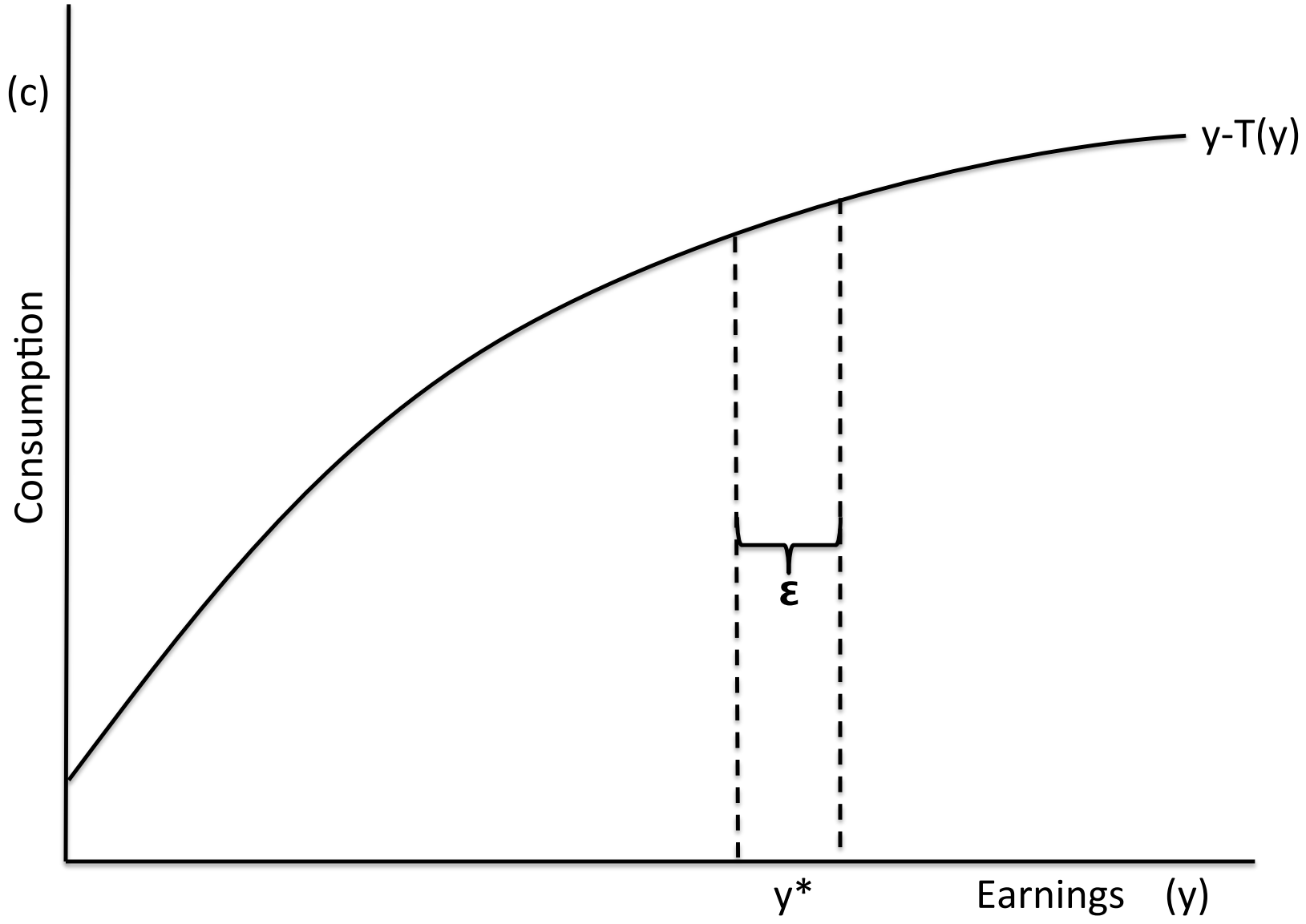

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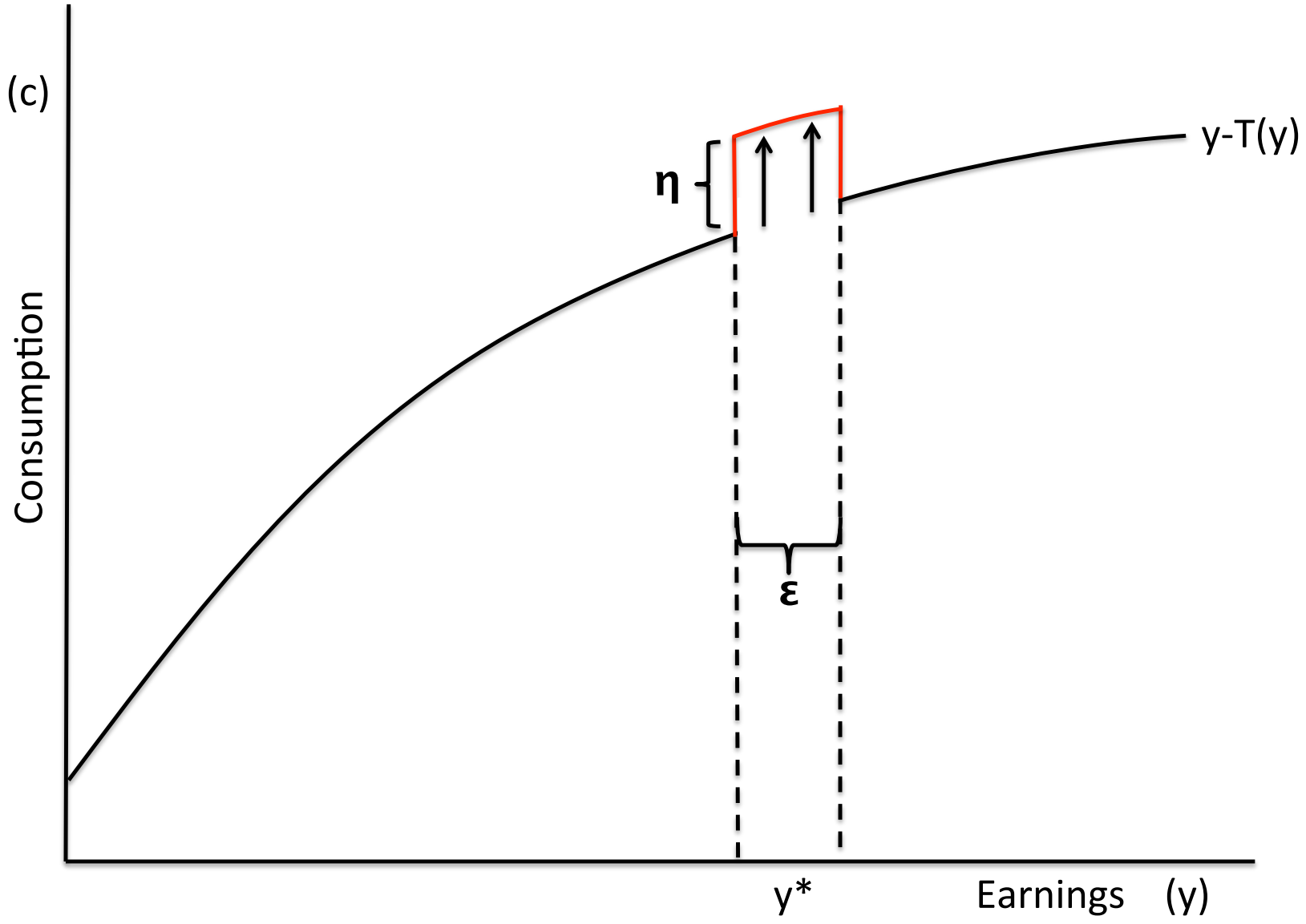

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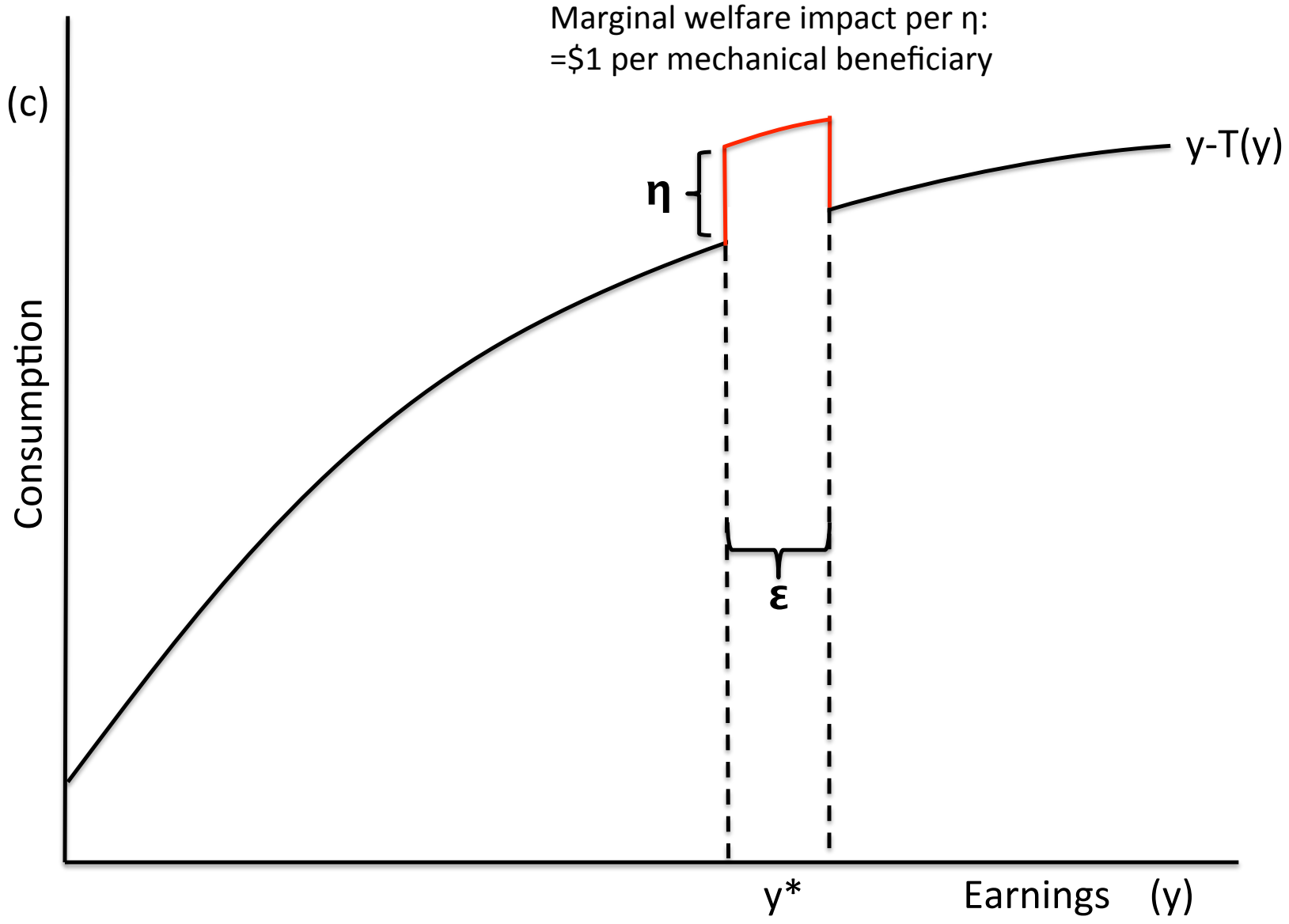

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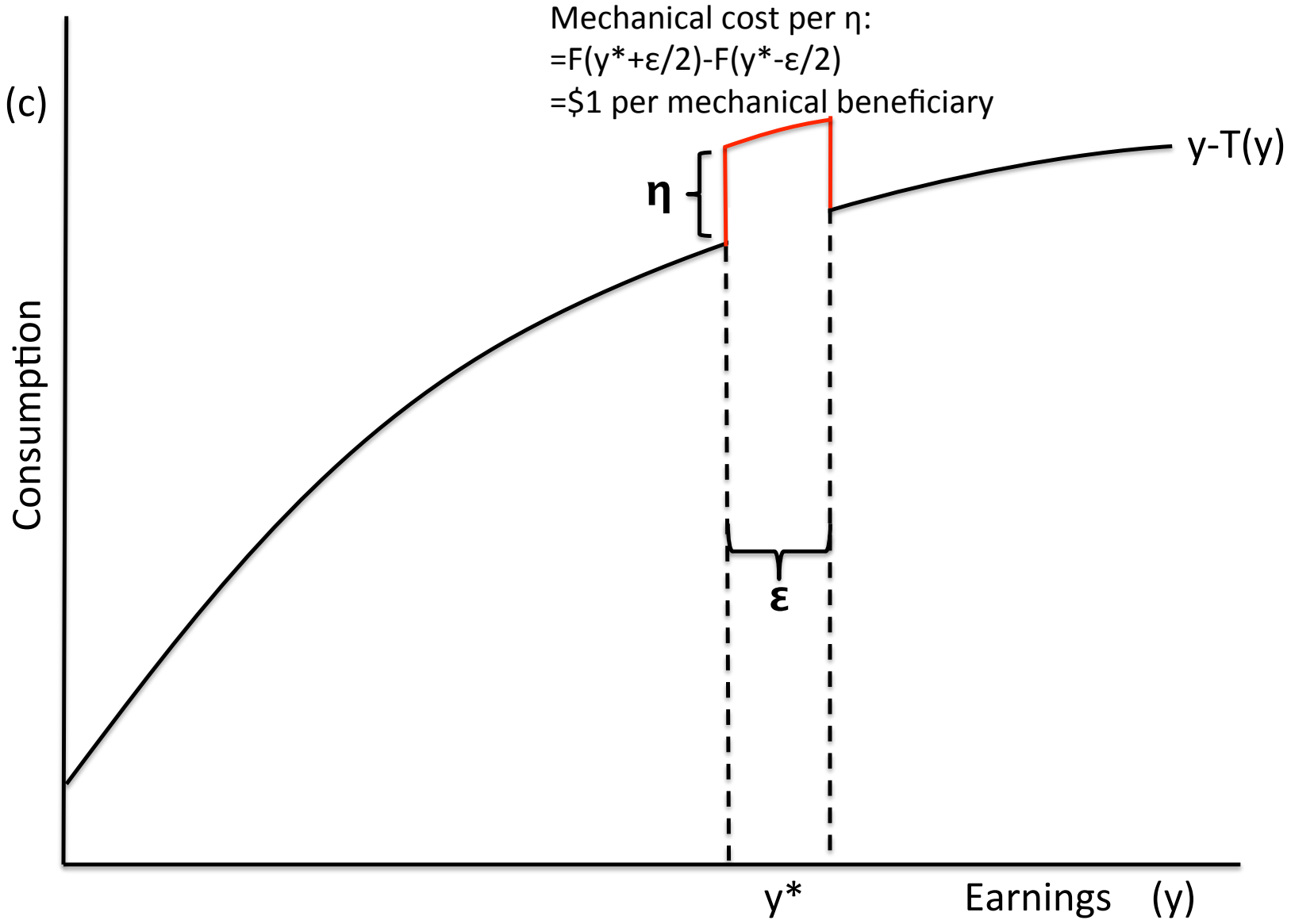

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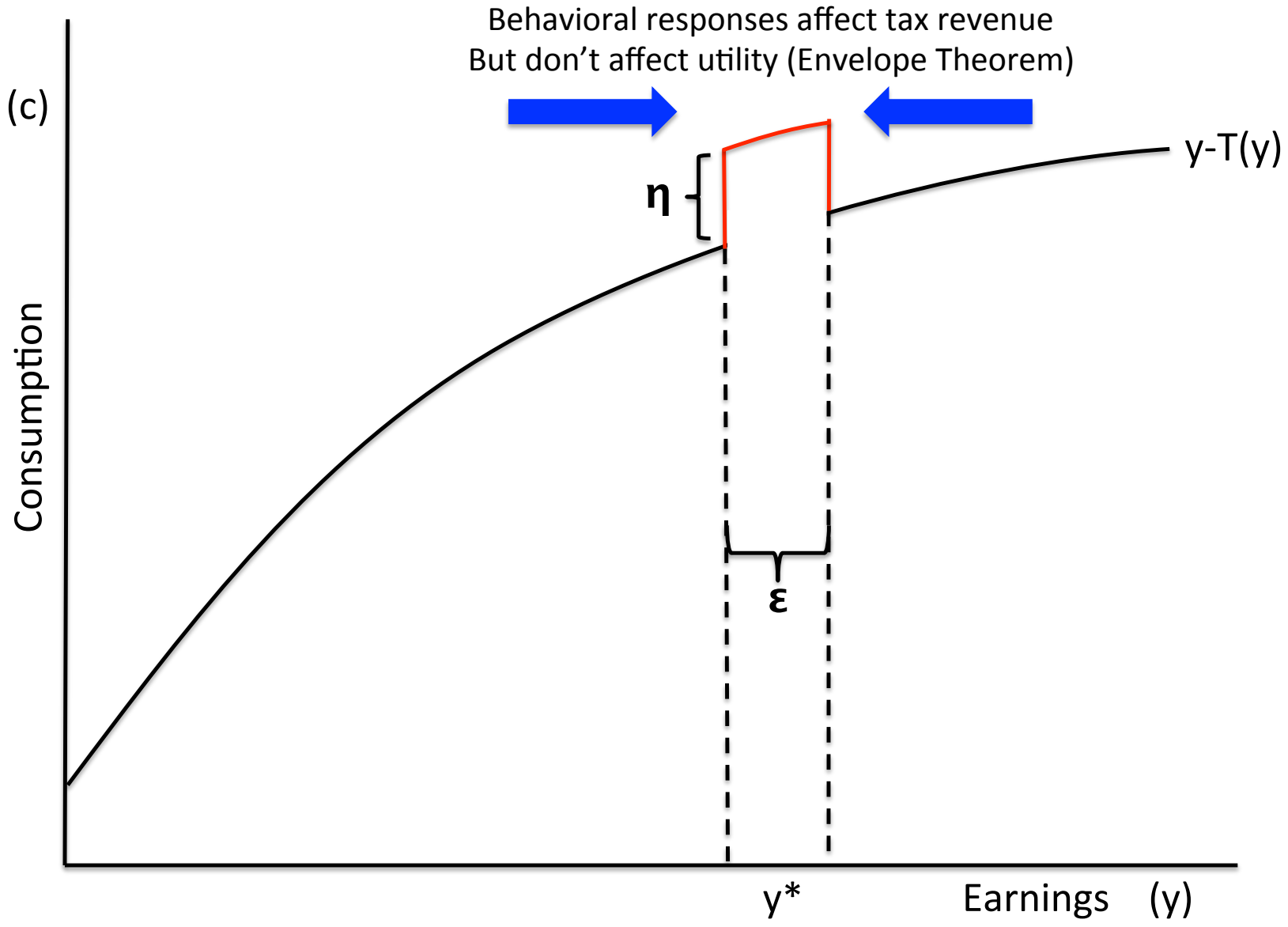

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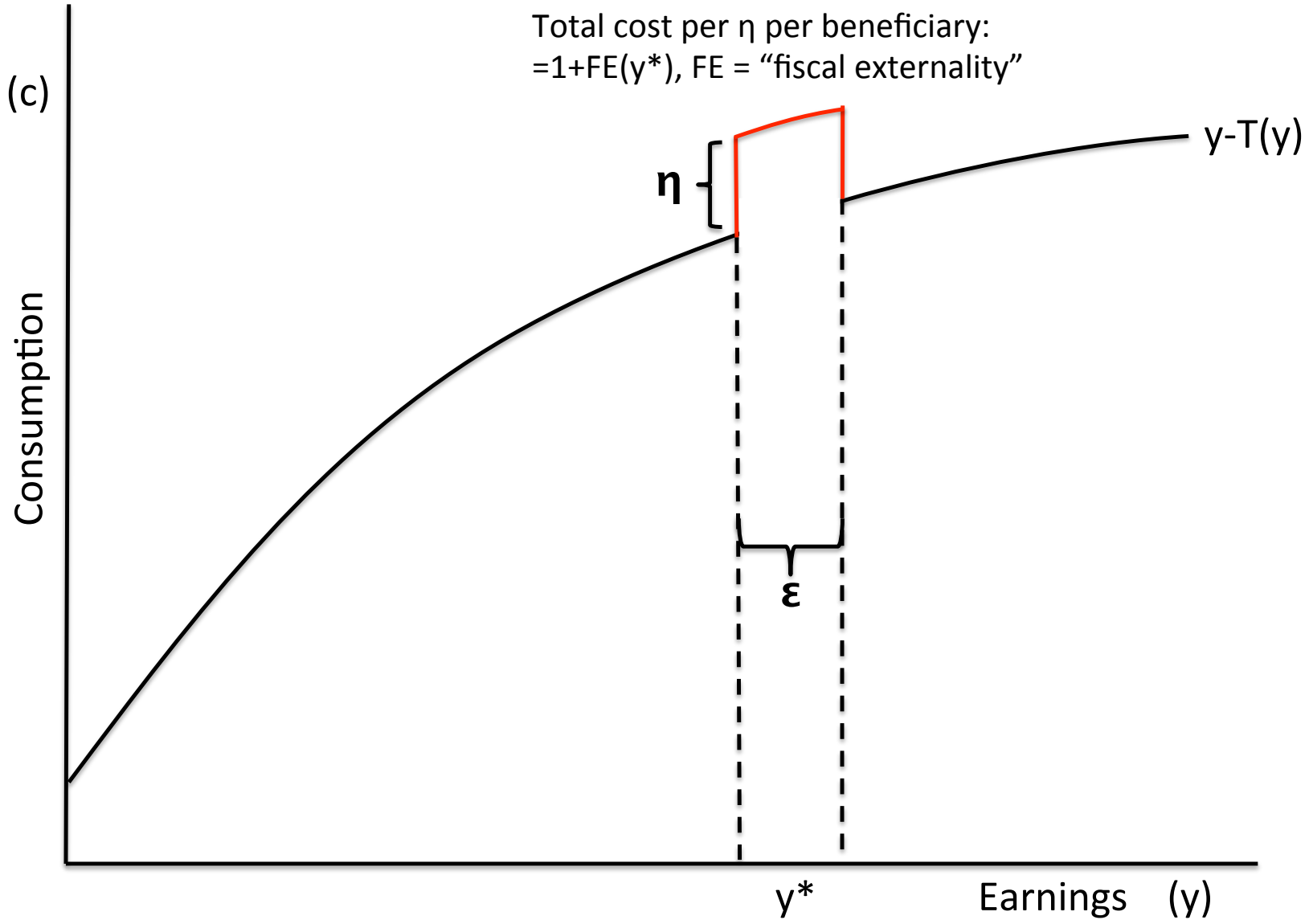

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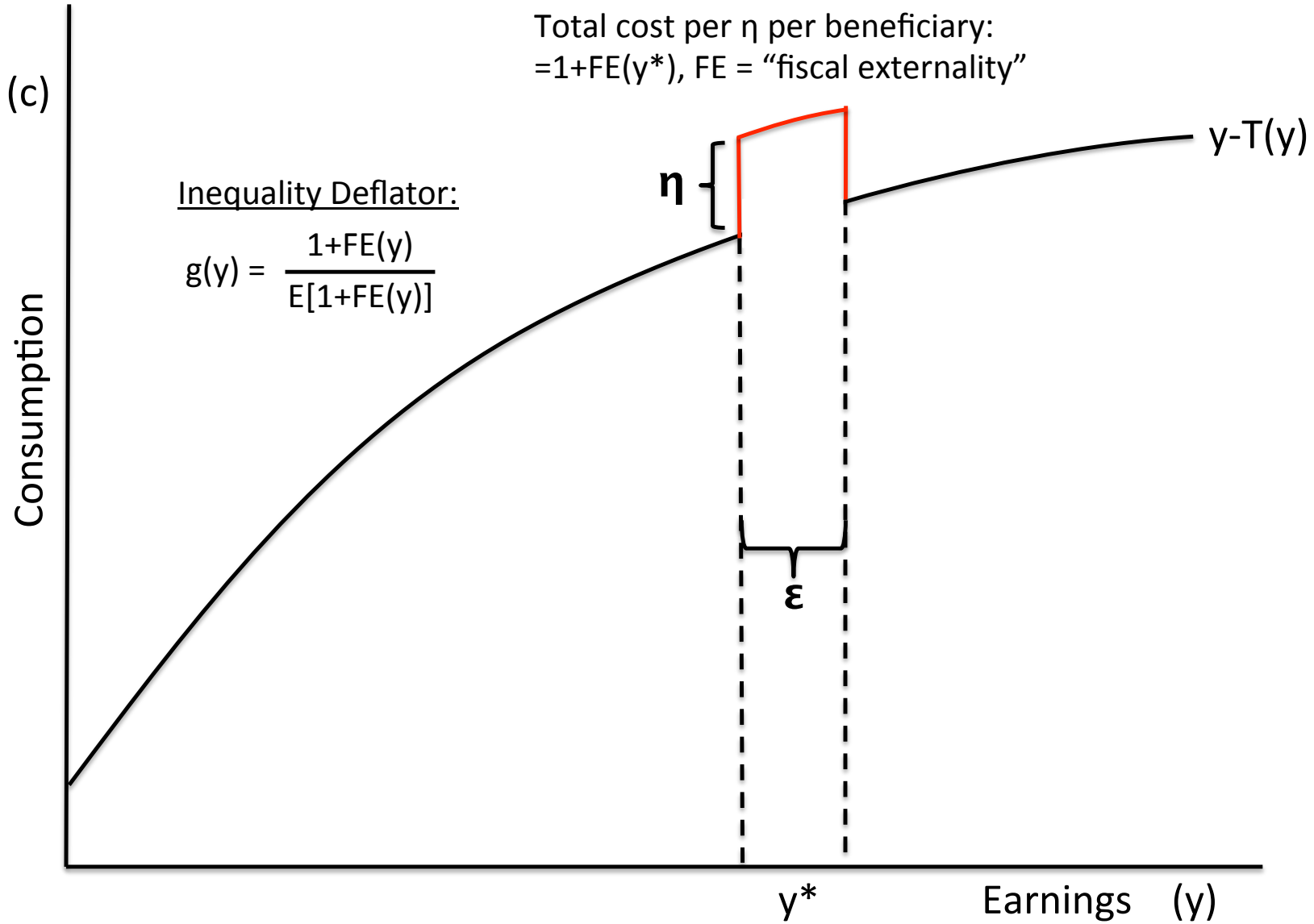

Formal Model

- Inequality deflator: Formal Model

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

- To first order: \$1 surplus to those earning y can be turned into $\$g(y)/n$ surplus to everyone through modifications to tax schedule

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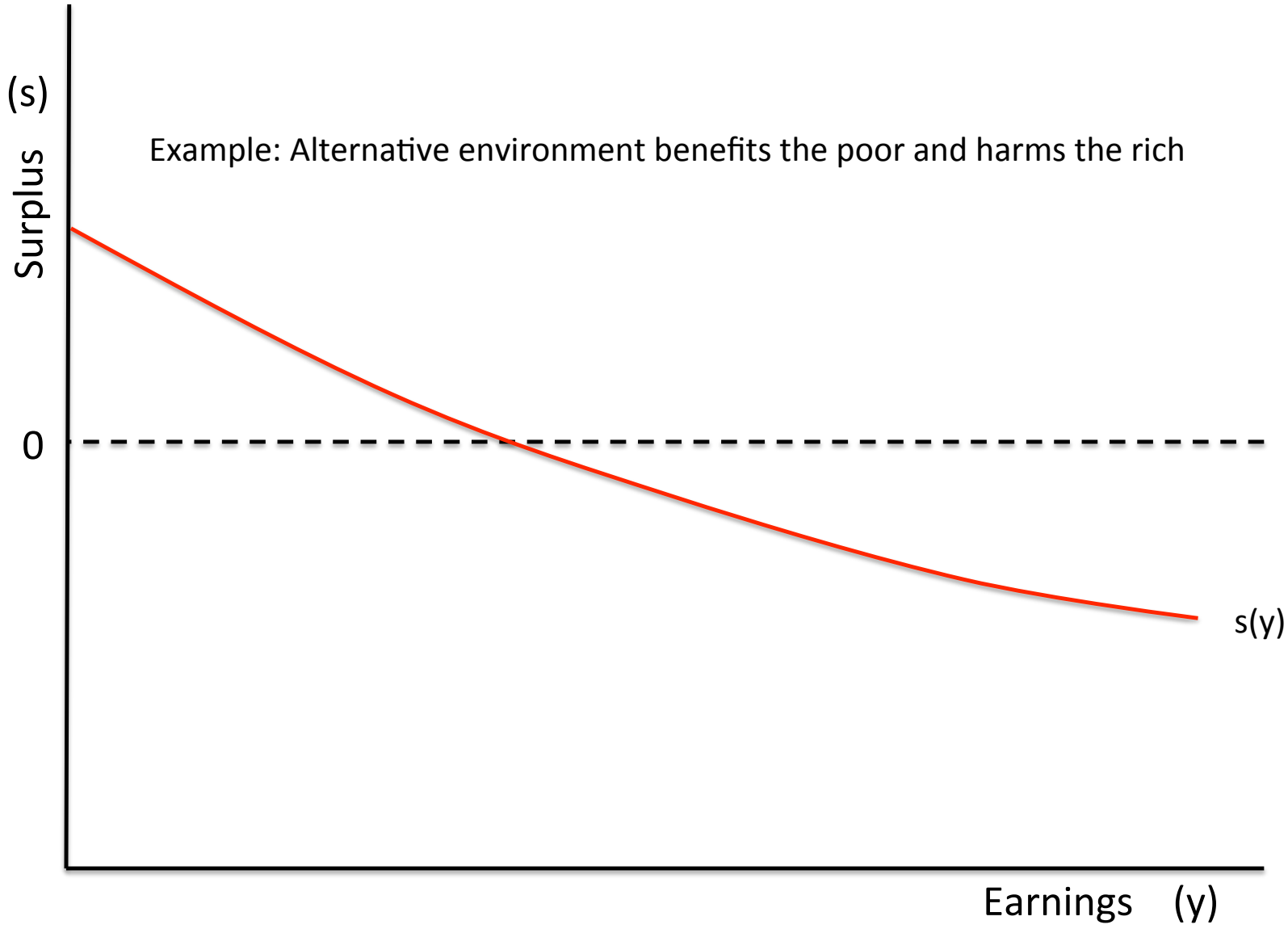
- Inequality Deflator can turn unequal surplus into equal surplus

Example: Alternative Environment Benefits Poor



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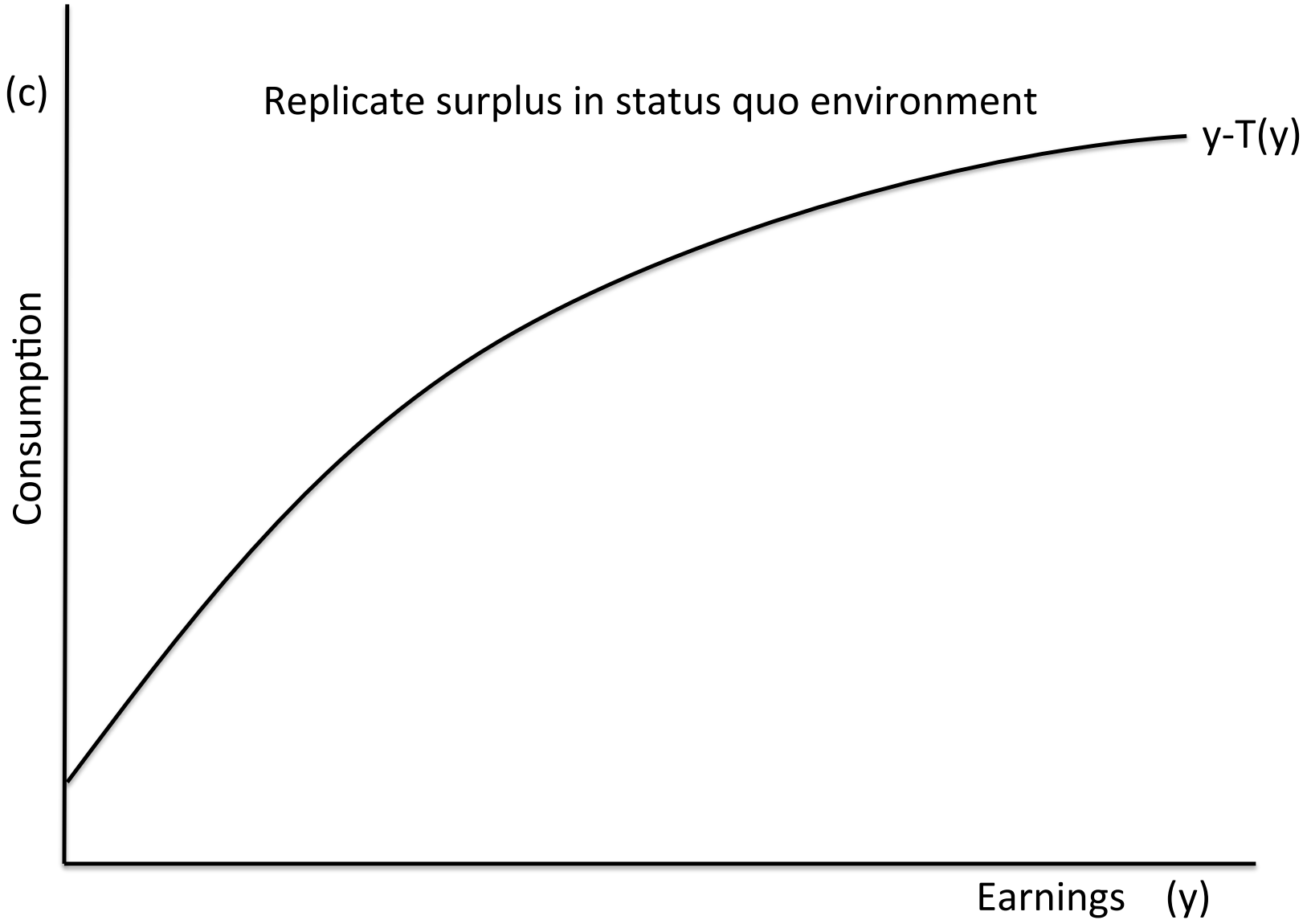
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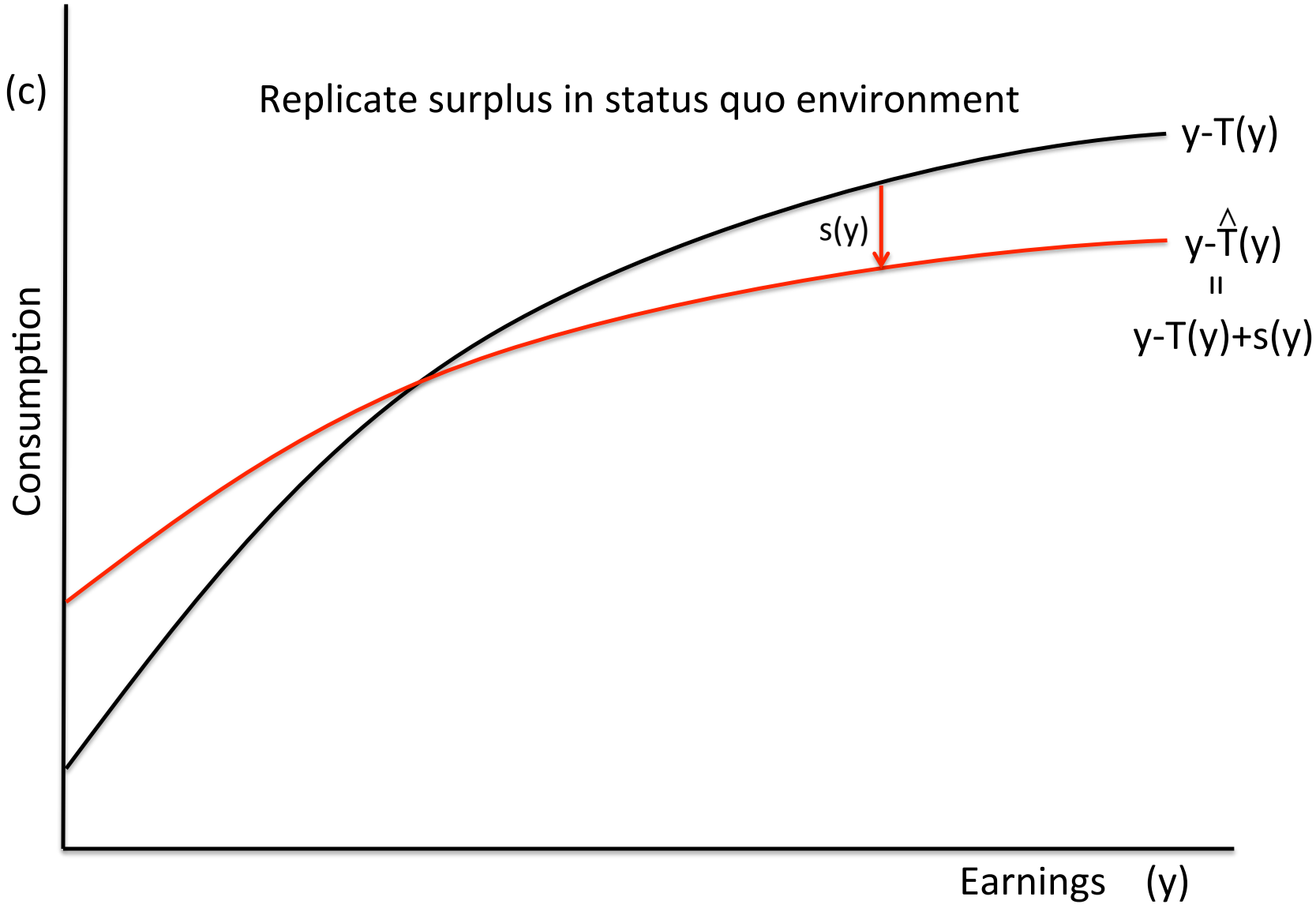
Replicate surplus in status quo environment
y-T(y)
Consumption
Earnings (y)

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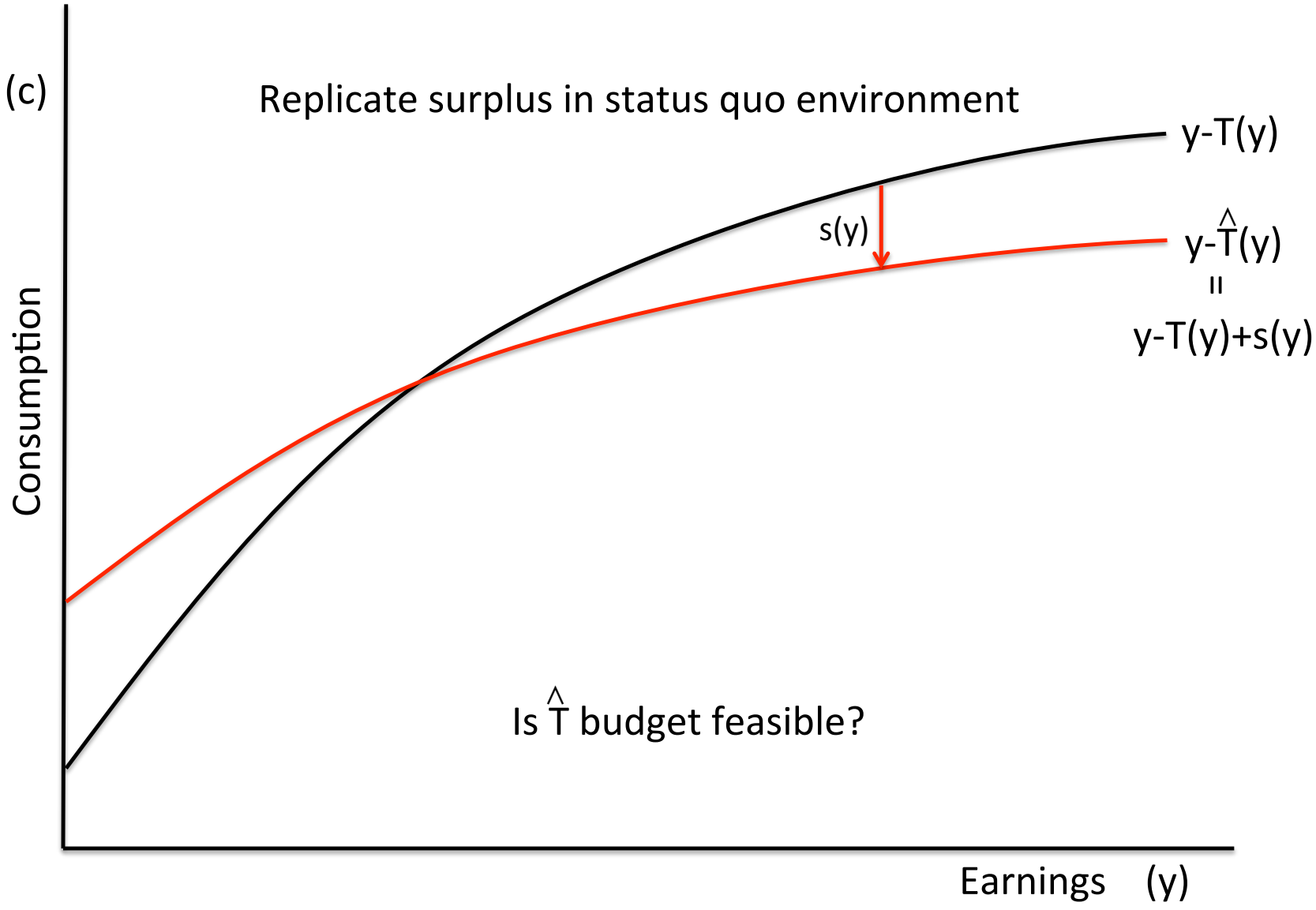
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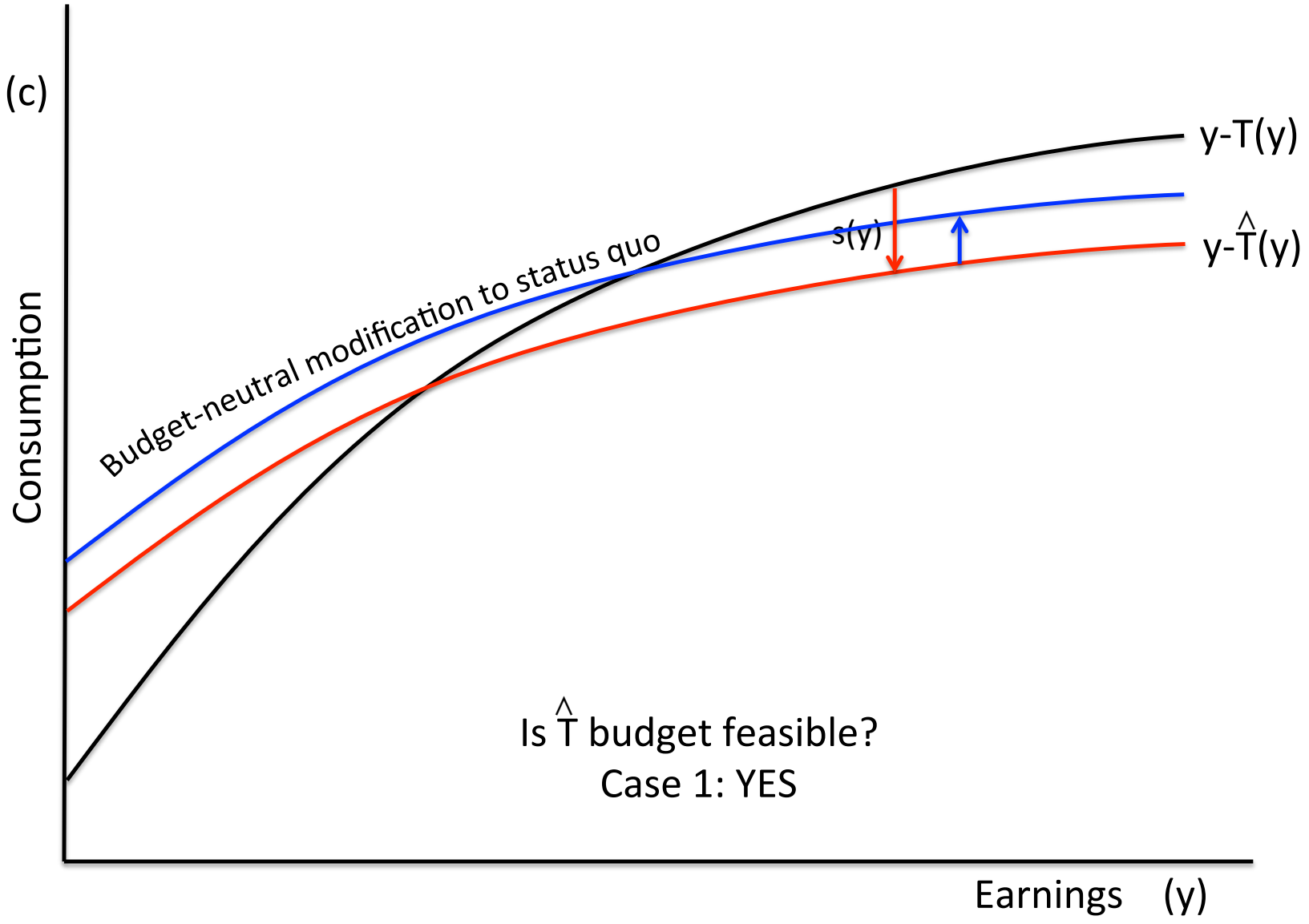
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Consumption
Earnings (y)
y-T(y)
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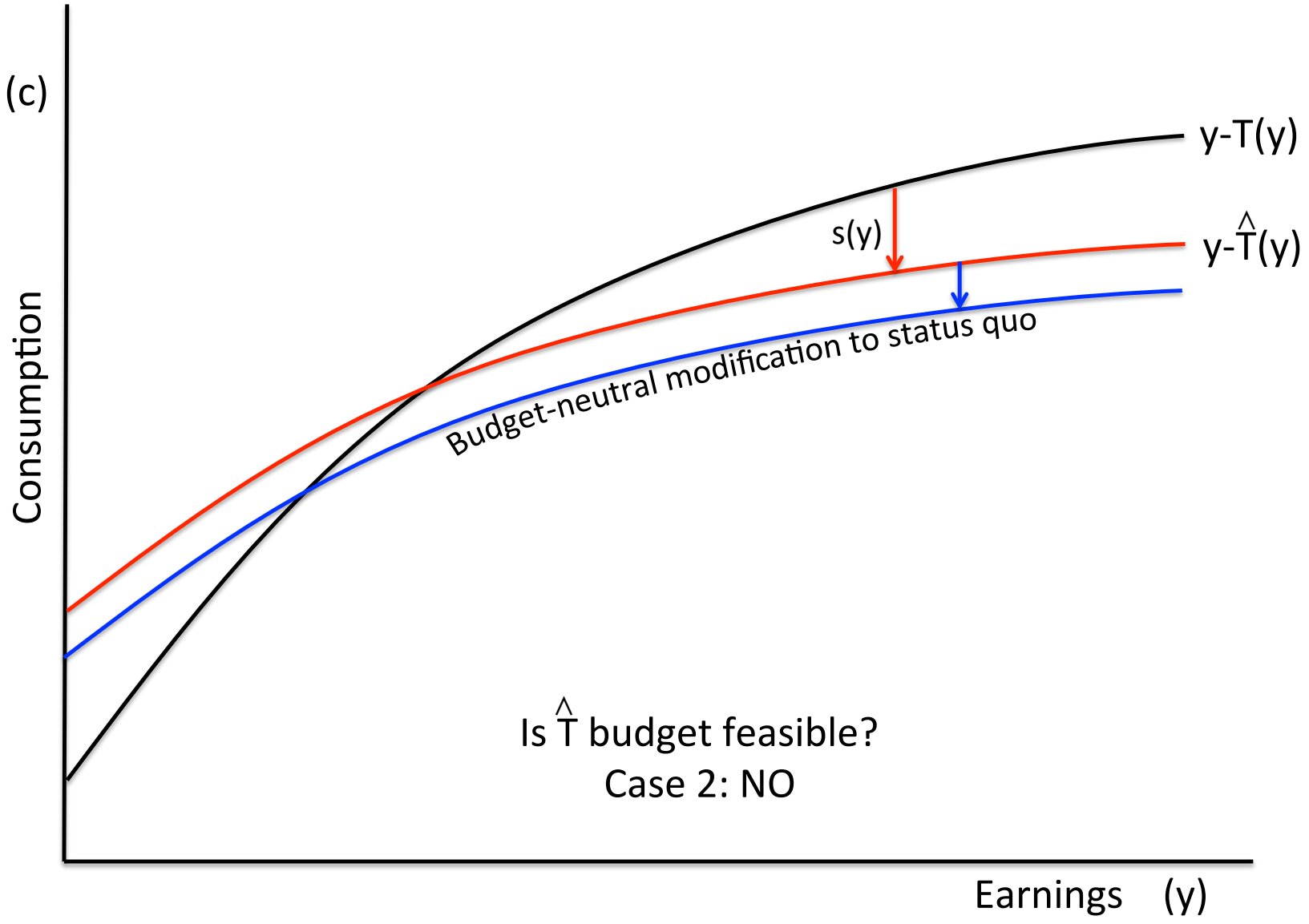
s(y)
Budget-neutral modification to status quo
Is $\hat{T}$ budget feasible?
Case 1: YES

"EV" Example


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

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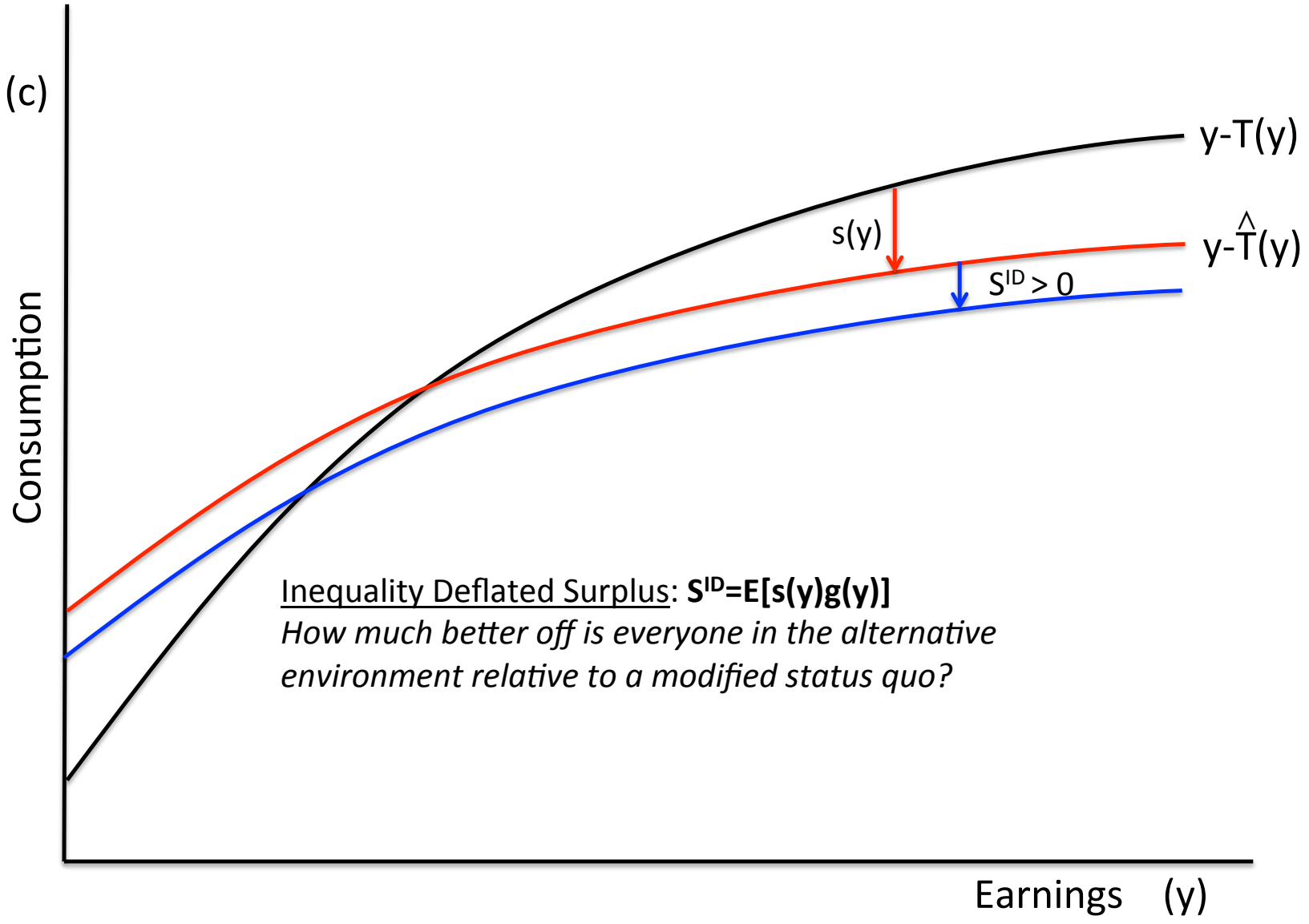

Inequality Deflated Surplus: **S^{ID}=E[s(y)g(y)]**

How much better off is everyone in the alternative environment relative to a modified status quo?

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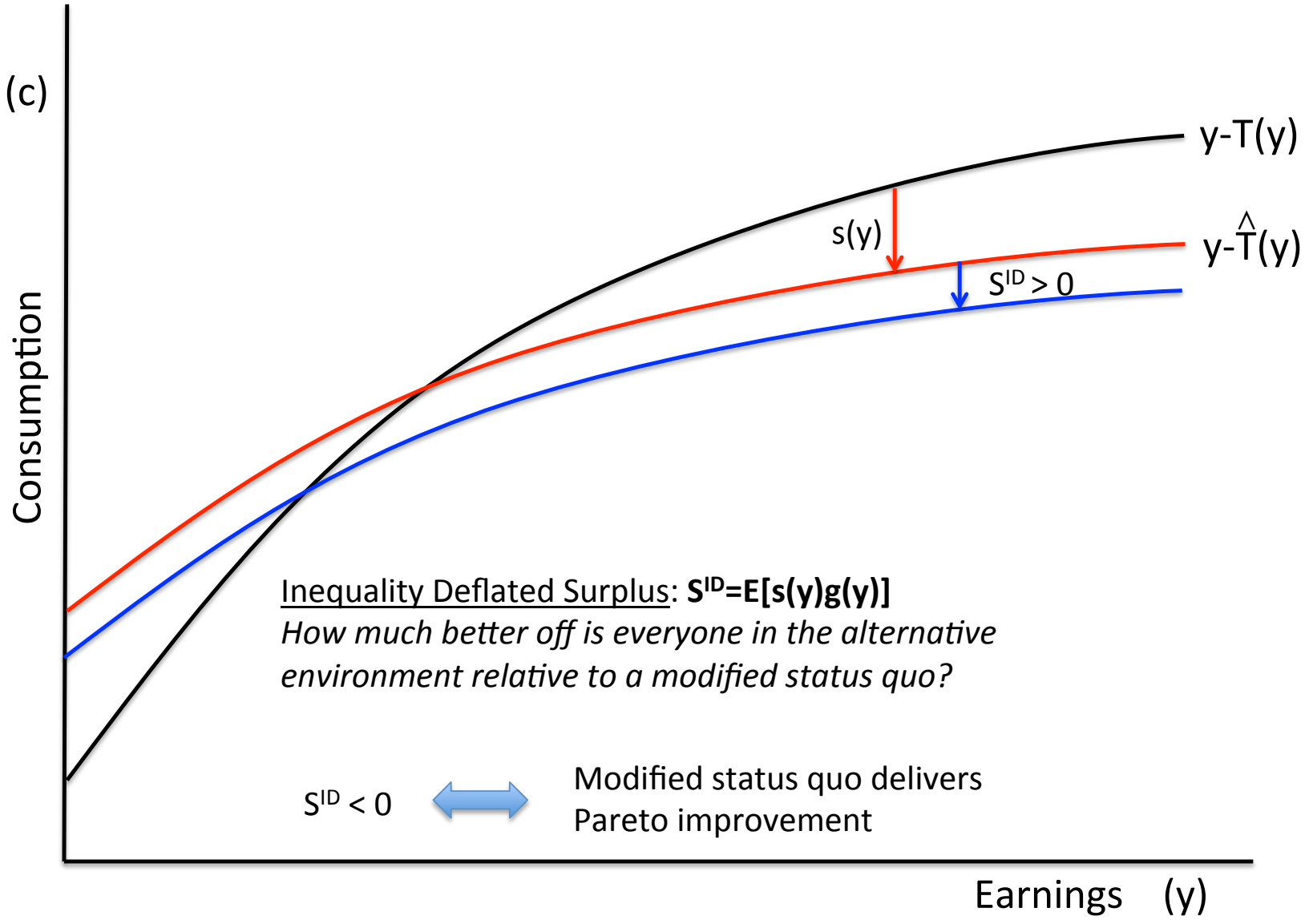

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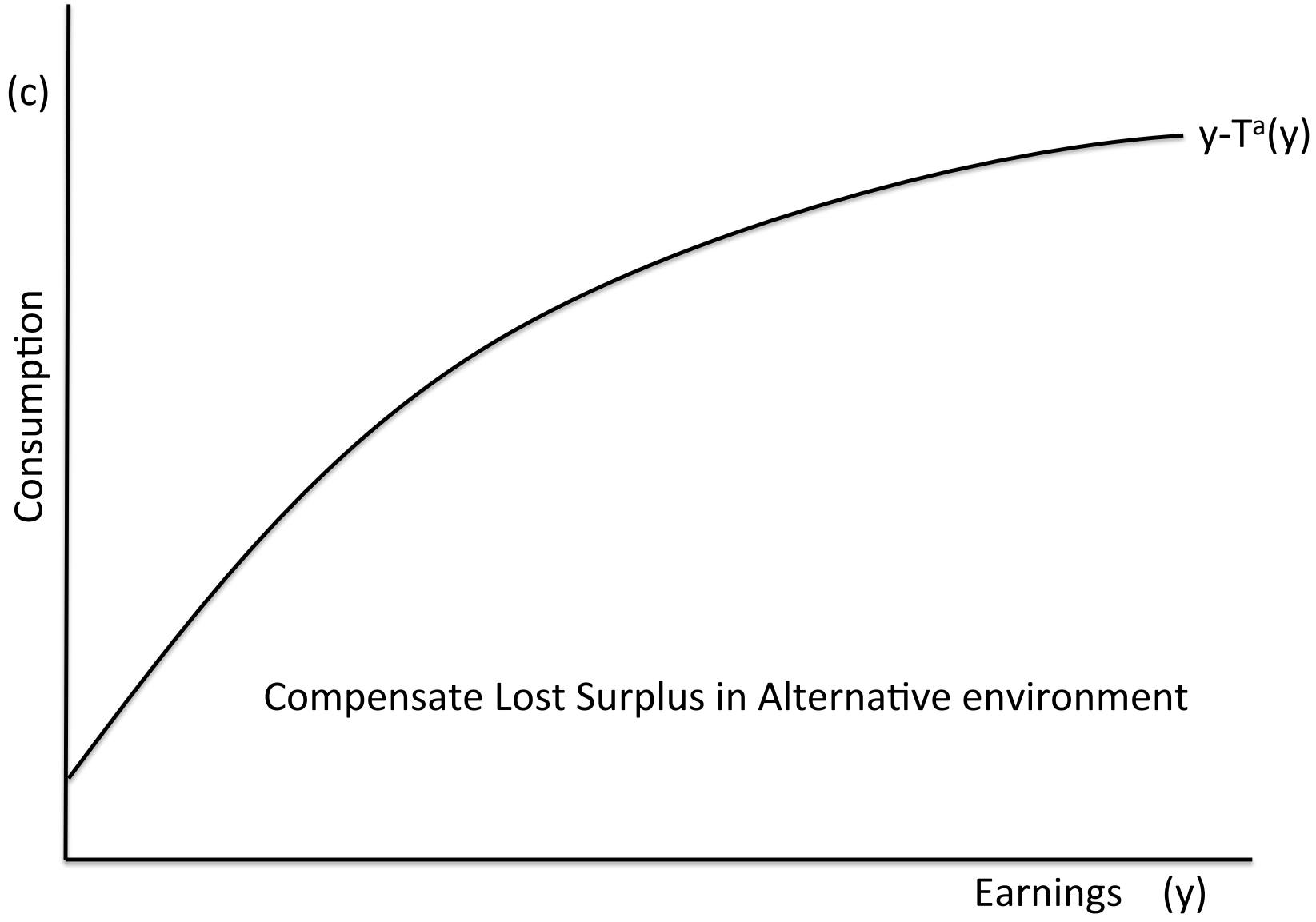
How much better off is everyone in the alternative environment relative to a modified status quo?

$S^{ID} < 0$ ⟺ Modified status quo delivers Pareto improvement

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? Formal "First Order" Statement
- "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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Consumption
y-T^a(y)
Compensate Lost Surplus in Alternative environment
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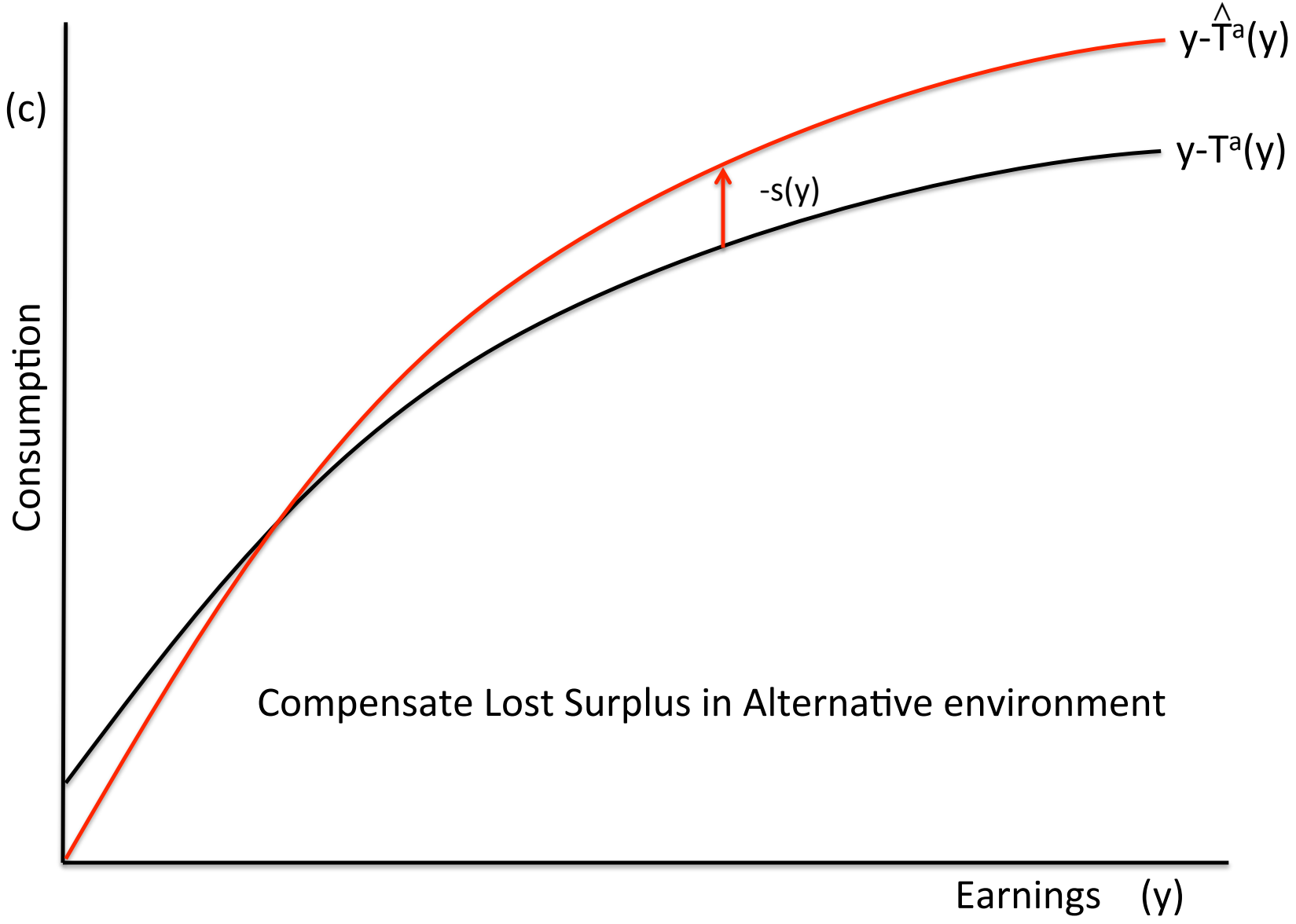
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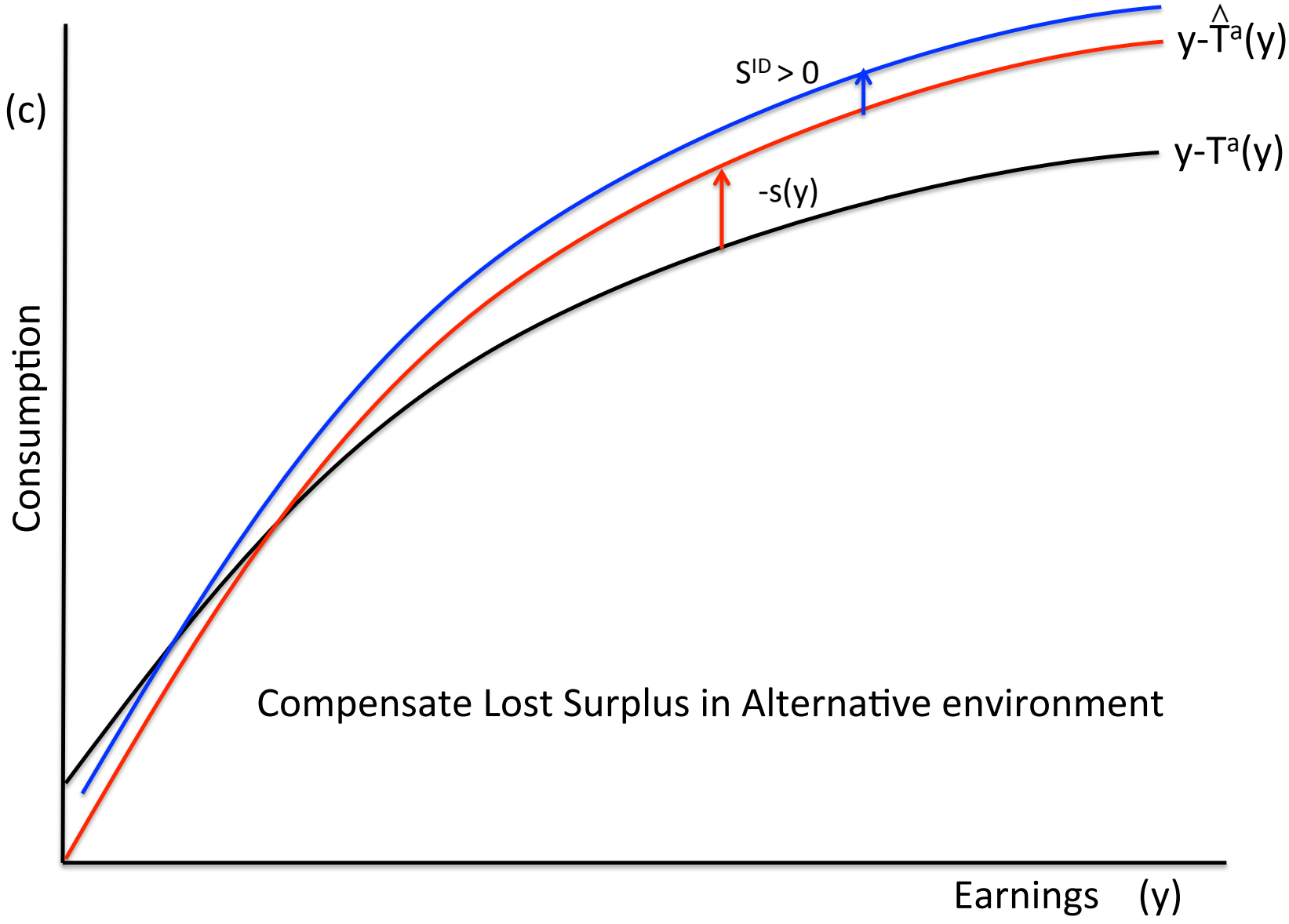
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Consumption
$S^{ID} > 0$
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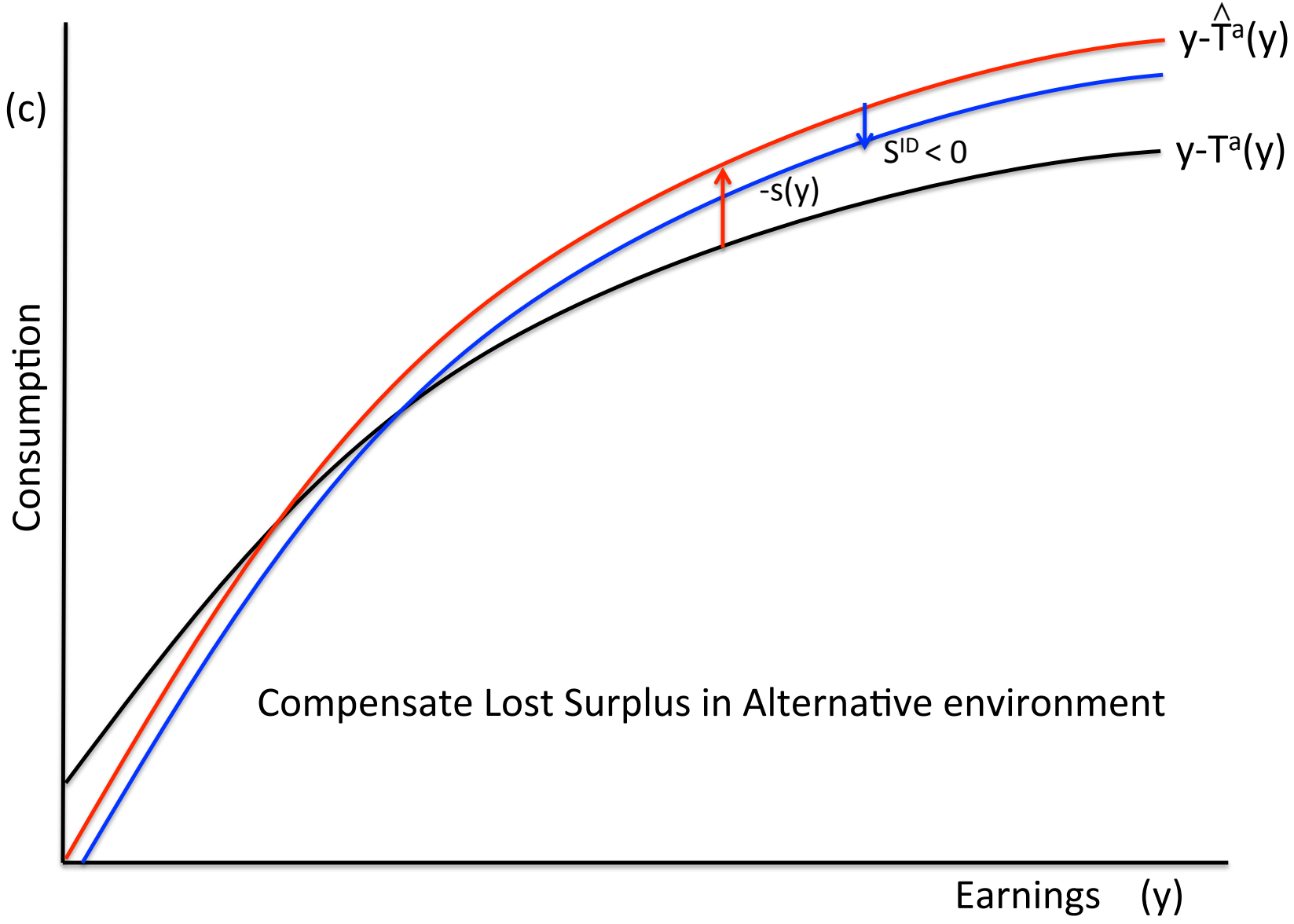
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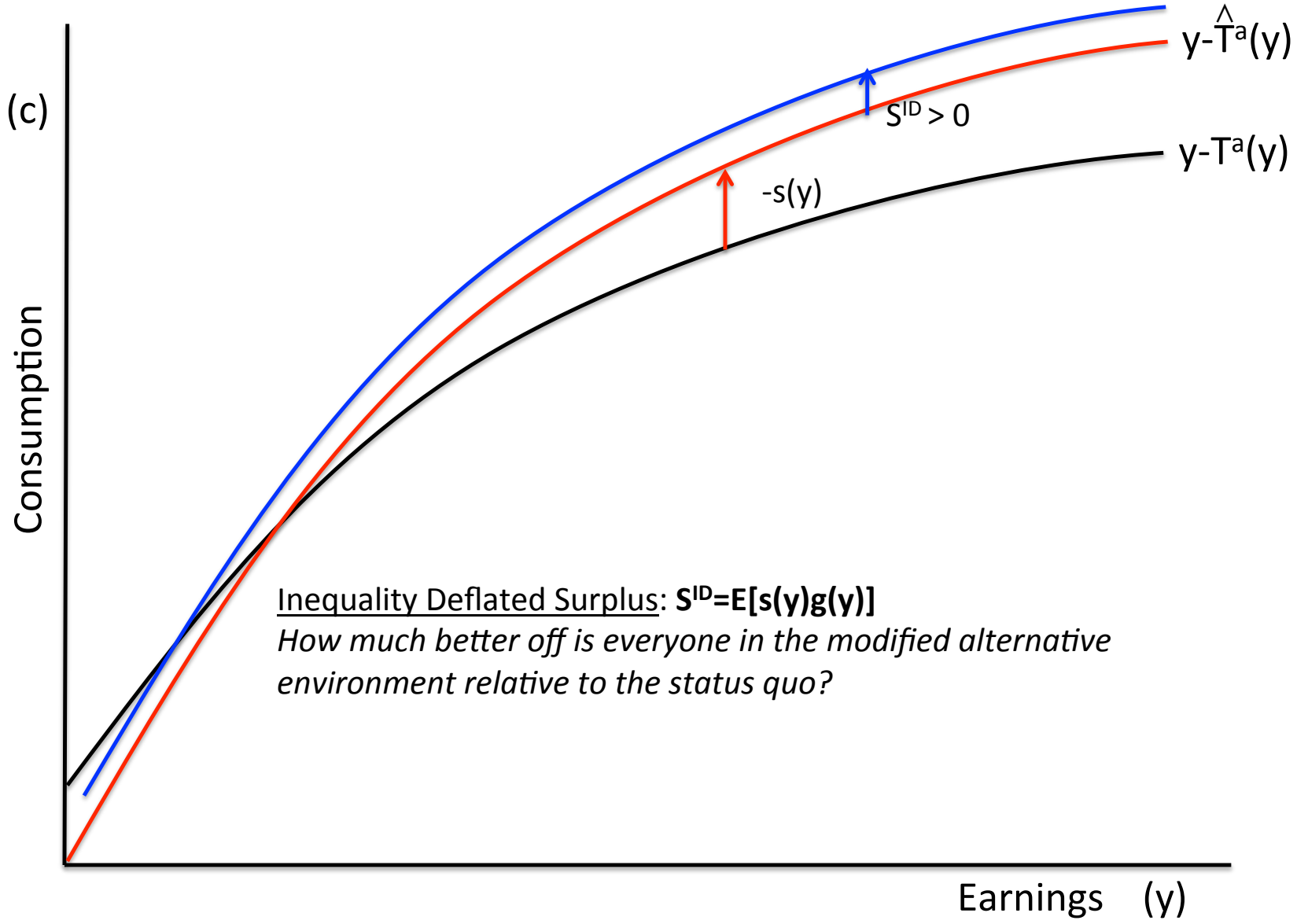

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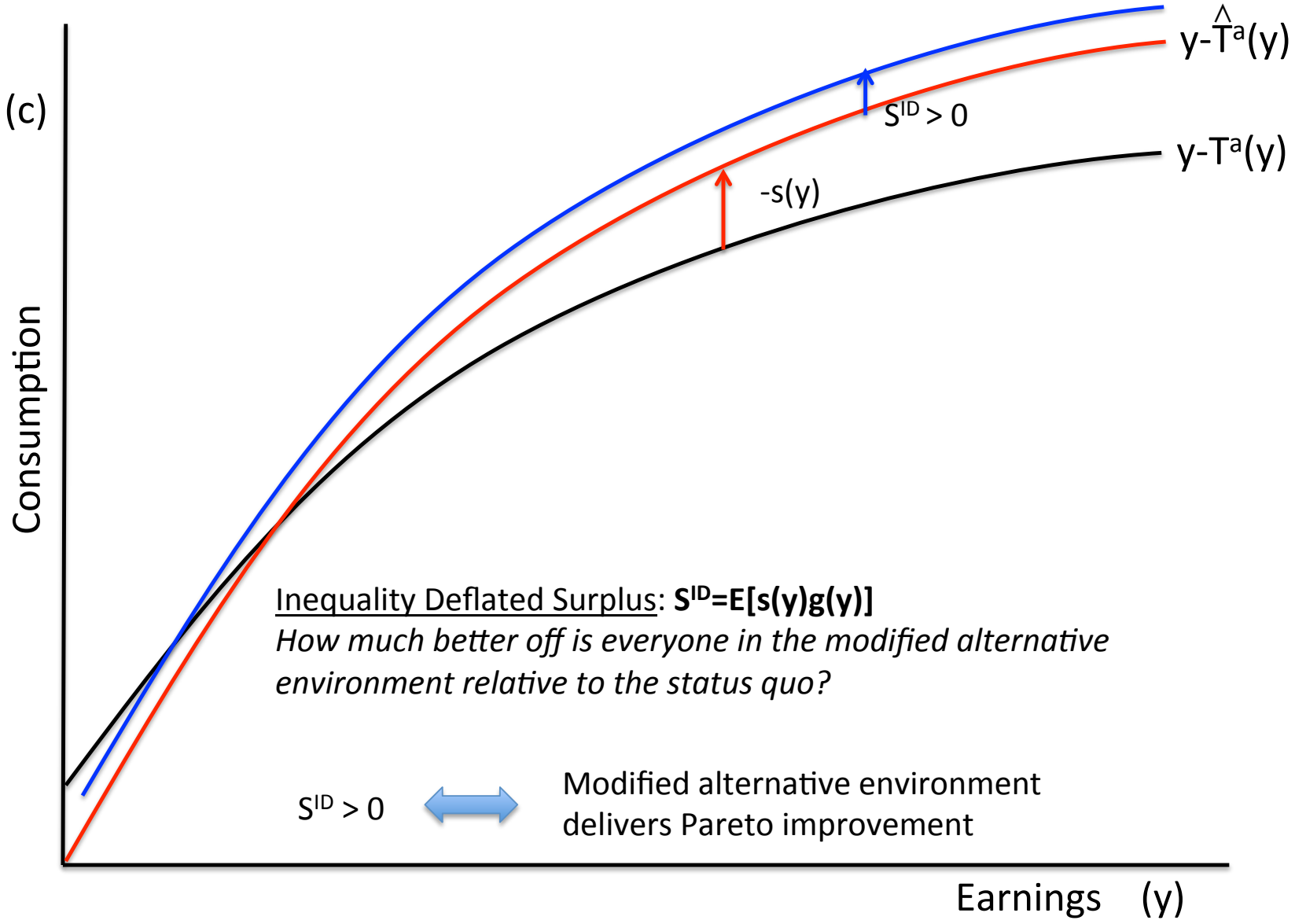

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Inequality Deflated Surplus <-> Pareto Comparisons

- If $g(y)$ is similar in status quo and alternative environment, these these two interpretations of inequality deflated surplus are first-order equivalent Formal Assumptions and Proposition
  - Similar to first order equivalence of CV and EV
- When surplus is homogeneous conditional on income:
  - S^{ID} provides first-order characterization of potential Pareto comparisons
  - S^{ID} quantifies difference between environments without making inter-personal comparisons
    - By how much is *everyone* better off?

Heterogeneous Surplus

- 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
  - But inequality deflator can still be used to characterize Pareto comparisons Proposition
- Define

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

$$\overline{S}^{ID} = E\left[max\left\{s(\theta) | y(\theta) = y\right\} g(y)\right] < 0$$

  - Modified alternative environment delivers Pareto improvement iff $\underline{S}^{ID} > 0$
  - Modified status quo offers Pareto improvement iff $\overline{S}^{ID} < 0$

Heterogeneous Surplus

- No potential Pareto ranking when $\underline{S}^{ID} < 0 < \overline{S}^{ID}$
- Potential solution: Add more status quo policies
- Marginal cost $1 + FE(\mathbf{X})$ as opposed to $1 + FE(y)$
  - Augment both tax schedule and Medicaid
- Inequality deflator well-suited for comparisons in which surplus does not vary conditional on income, so that $\underline{S}^{ID} = S^{ID} = \overline{S}^{ID}$

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- **Reduced form empirical evidence suggests deflator values poor more so than the rich**
  - 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

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- Let

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

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

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

Formal Definitions

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 General Formula

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- Generalized version of "uni-dimensional" formulas (e.g. Bourguignon and Spadaro (2012), Zoutman (2013a, 2013b))

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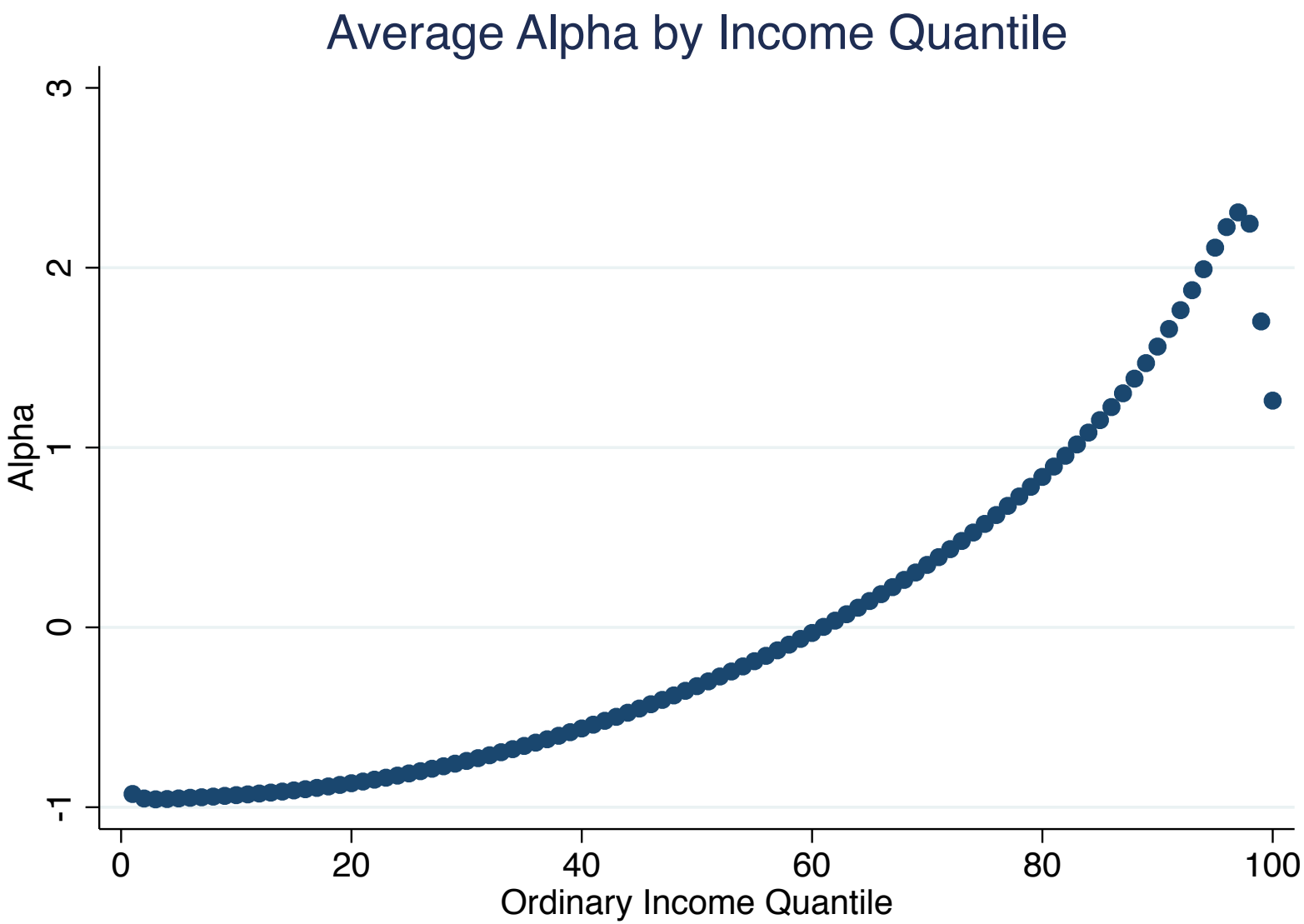
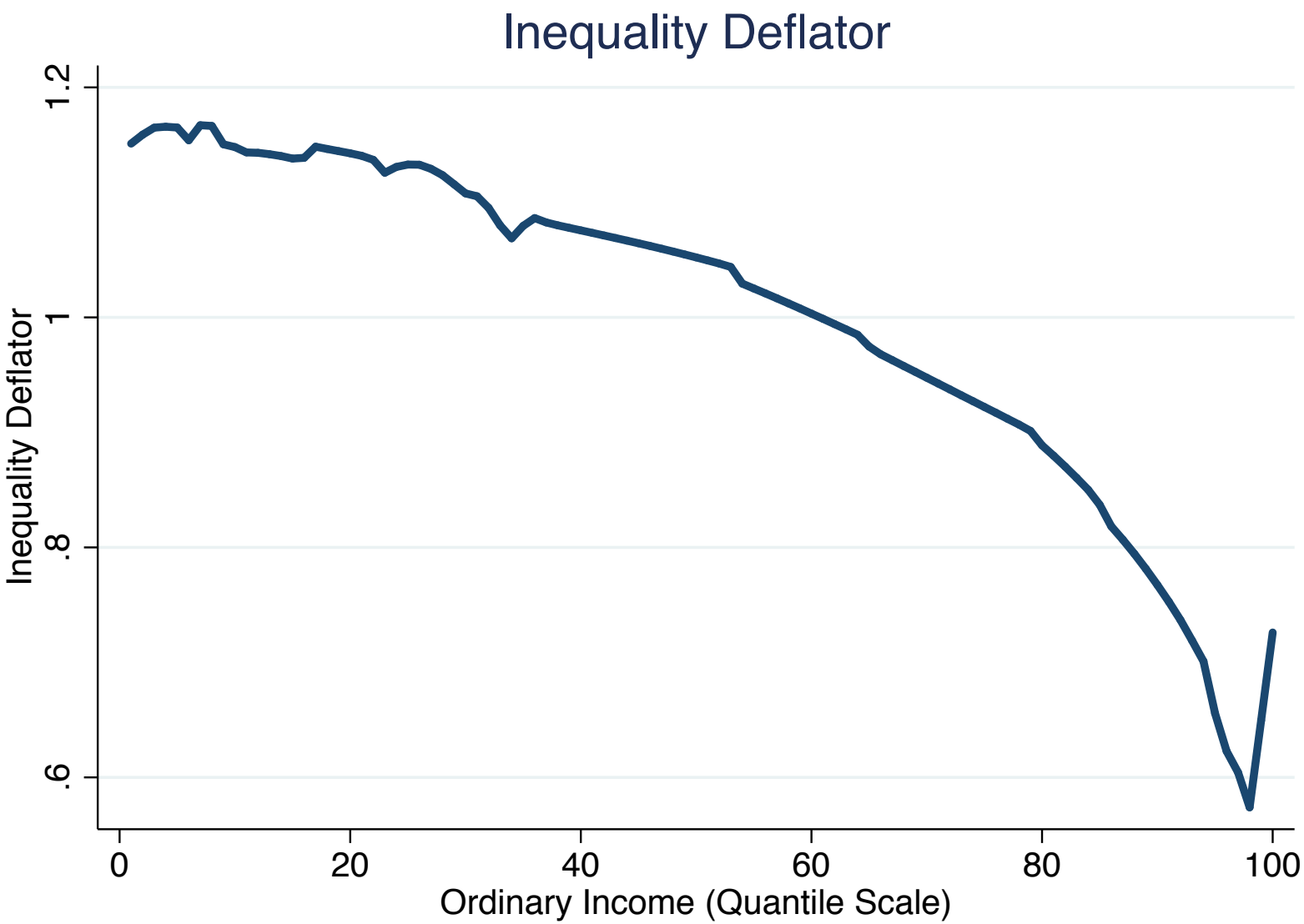
  - Account for covariance between elasticity of income distribution and marginal tax rate Estimation Details

Average Alpha



Inequality Deflator



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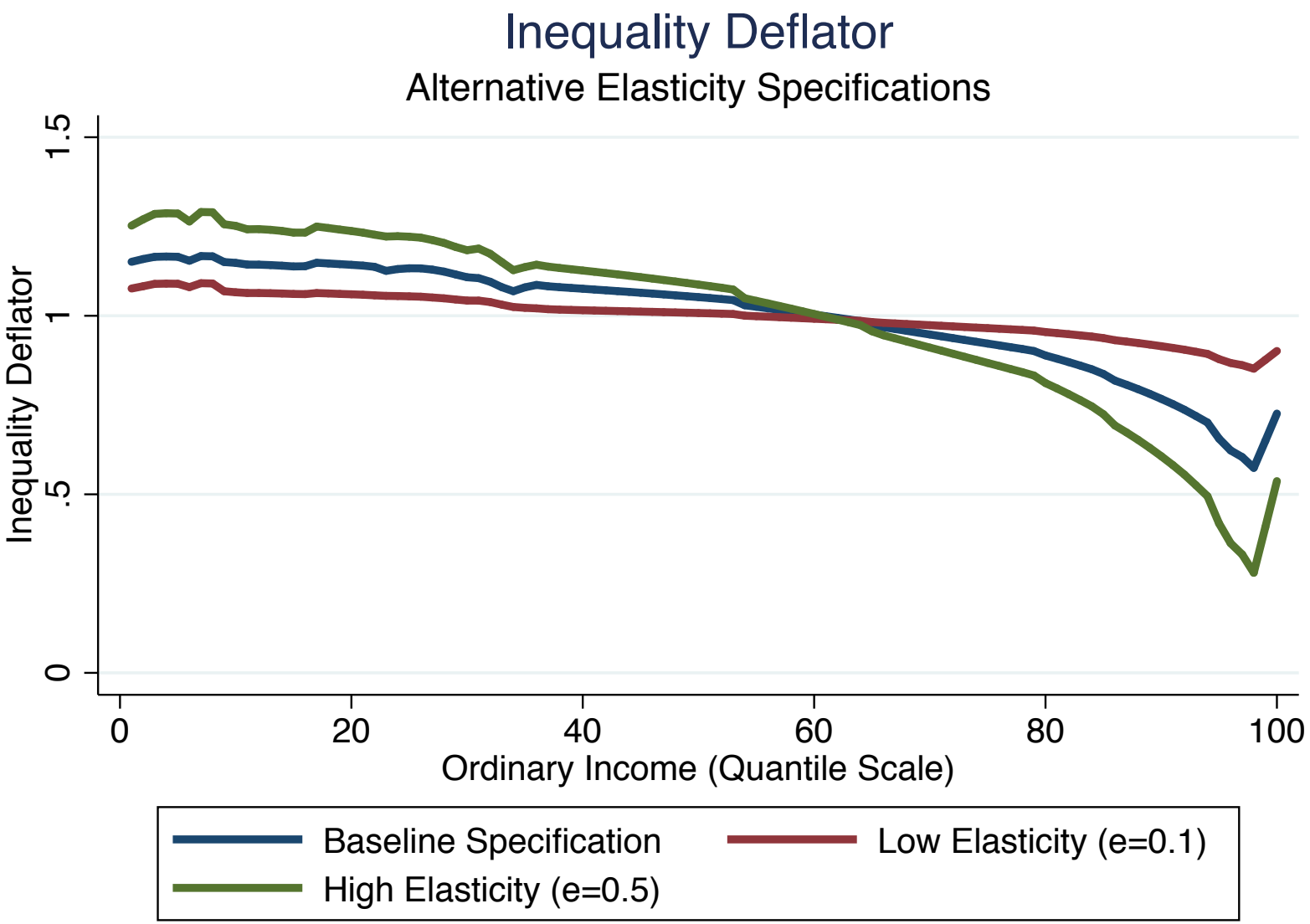
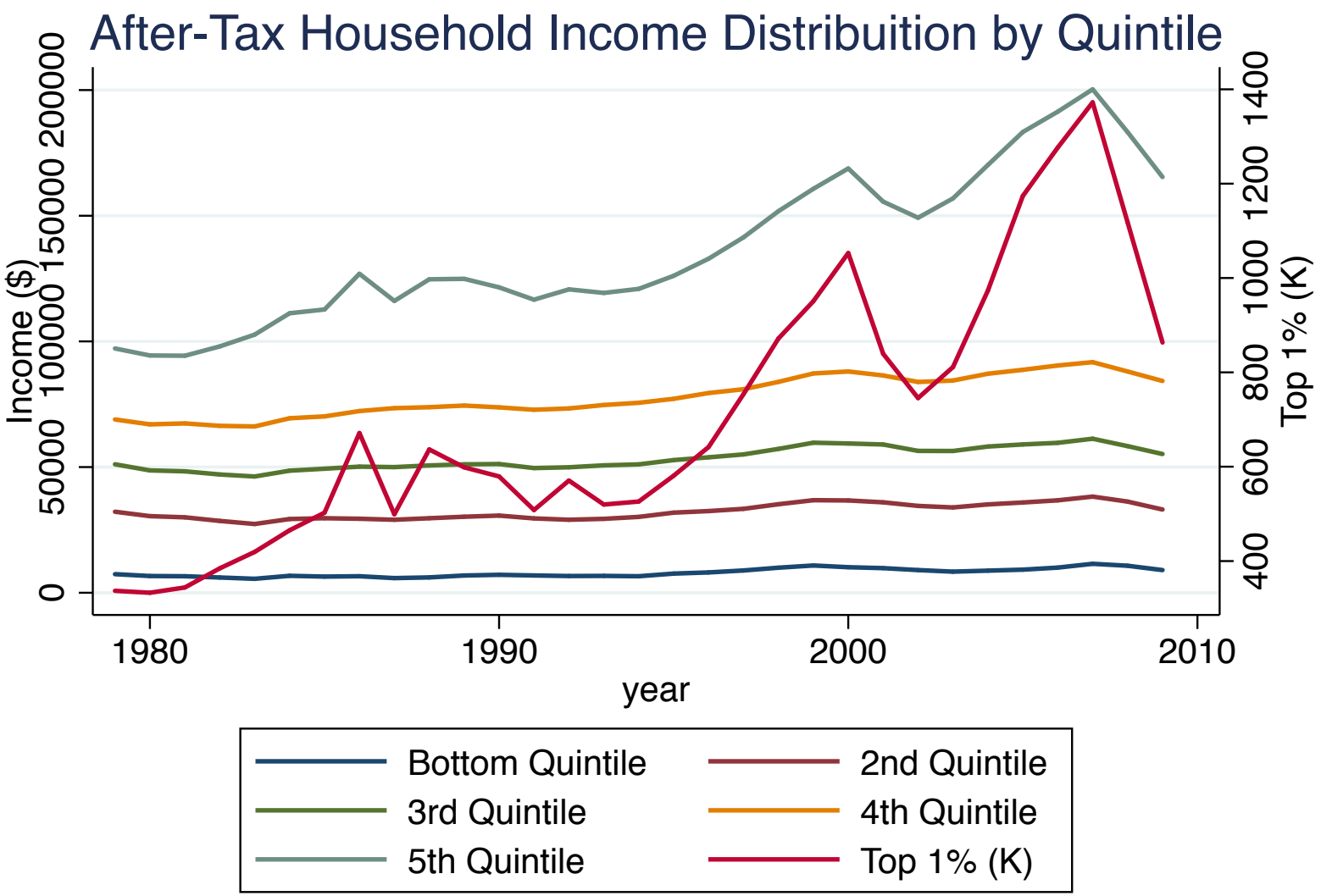


Application #1: Income Inequality



Source: CBO; Supplamental Tables 43373, Table 7

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$$s(\theta) = Q_a(\alpha(\theta)) - Q_0(\alpha(\theta))$$

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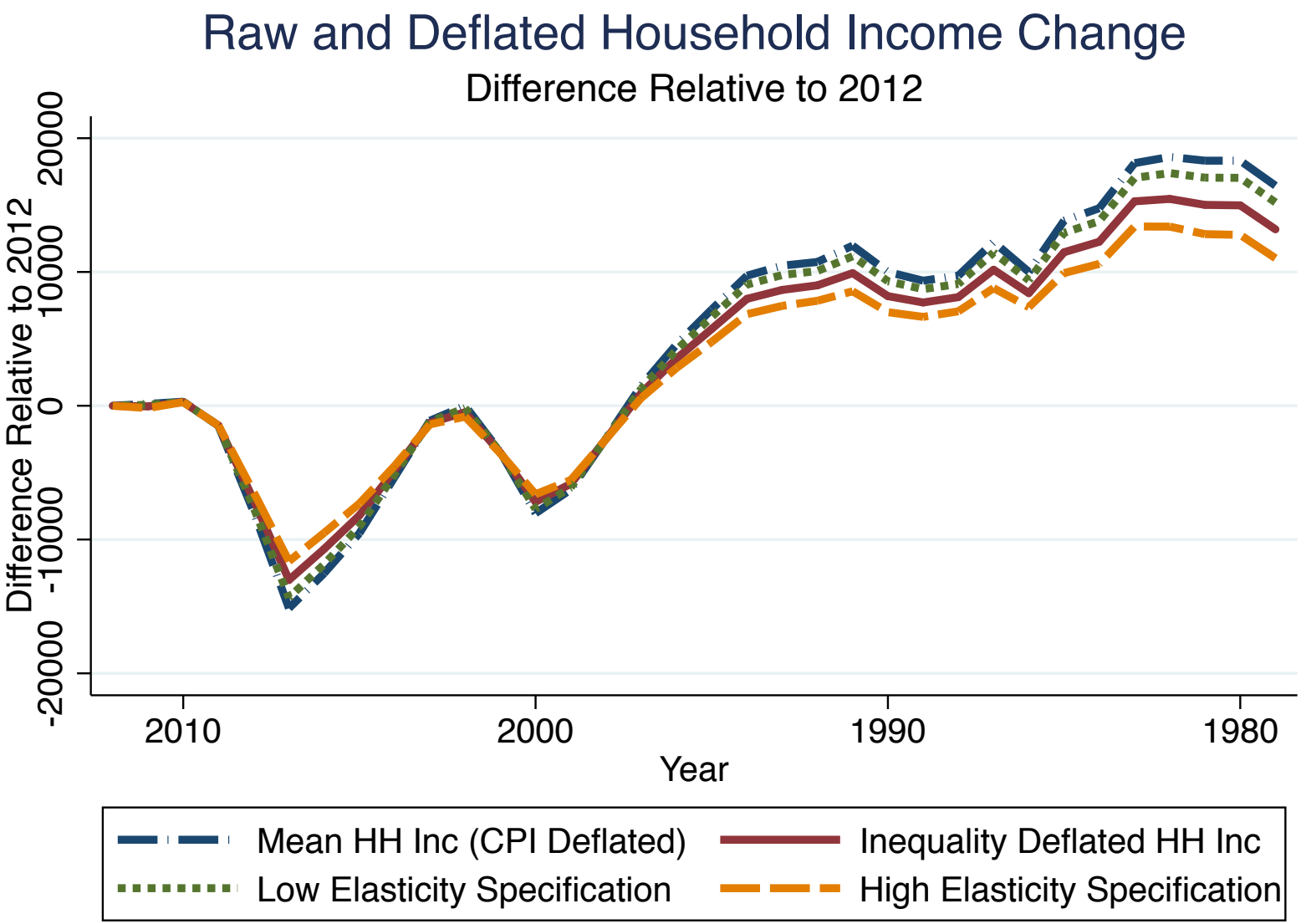
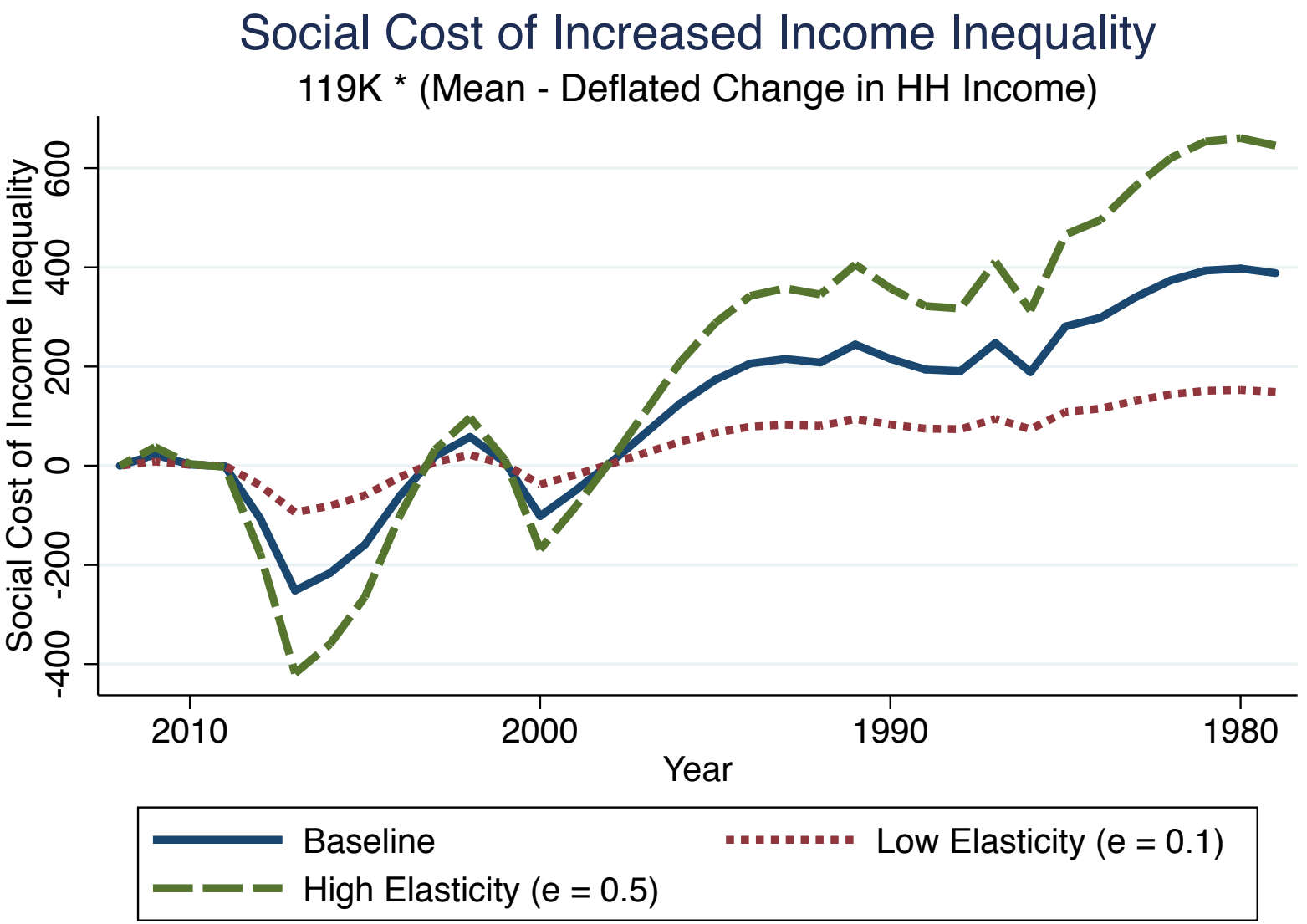
  - More costly to make the rich poor and the poor rich than to keep everyone rich and poor

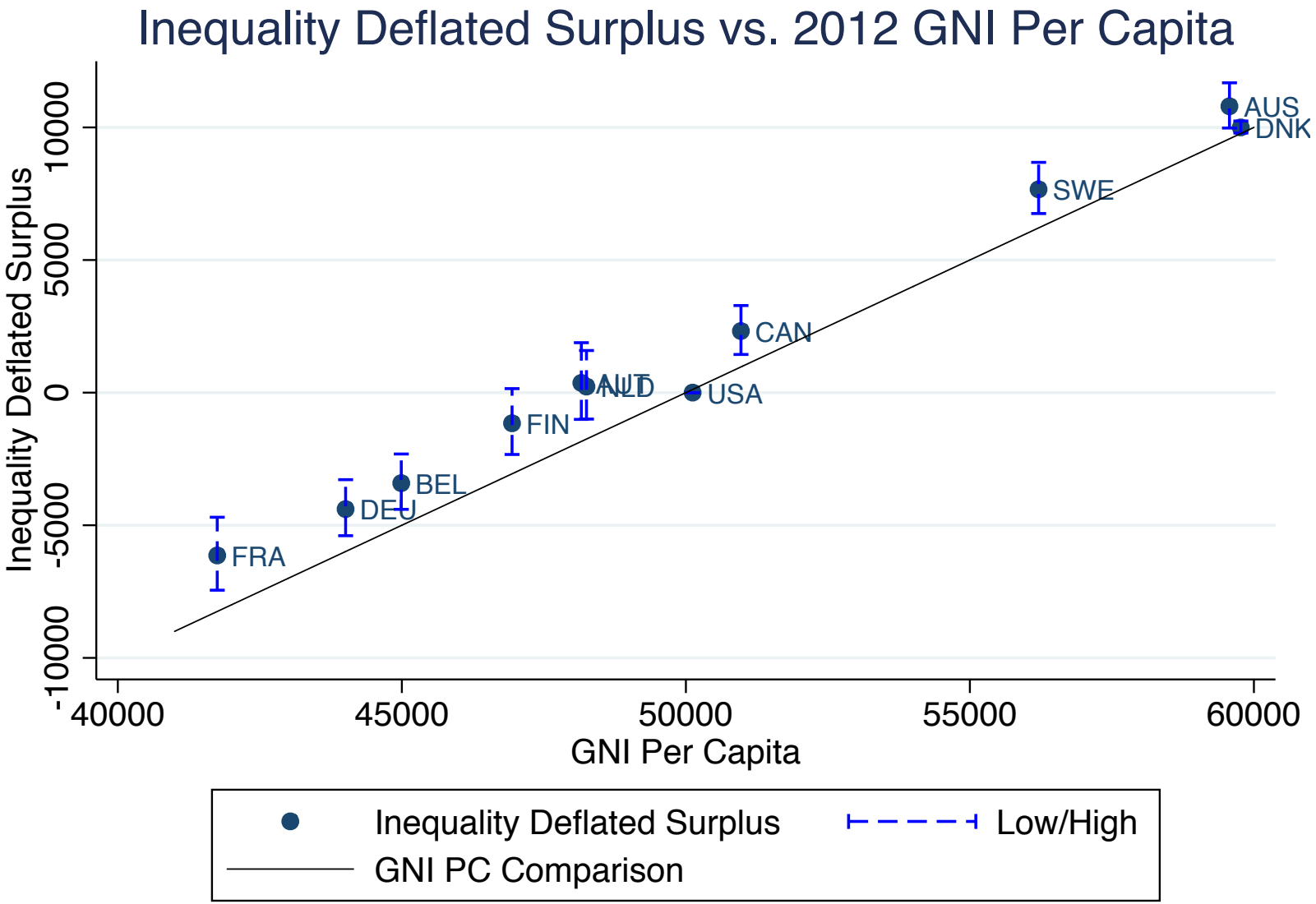
Deflated Growth



Social Cost of Increased Income Inequality



Country Comparison to US



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)
- What about non-budget neutral policies?

Targeted Policies

- Suppose G affects those with income y
- Construct

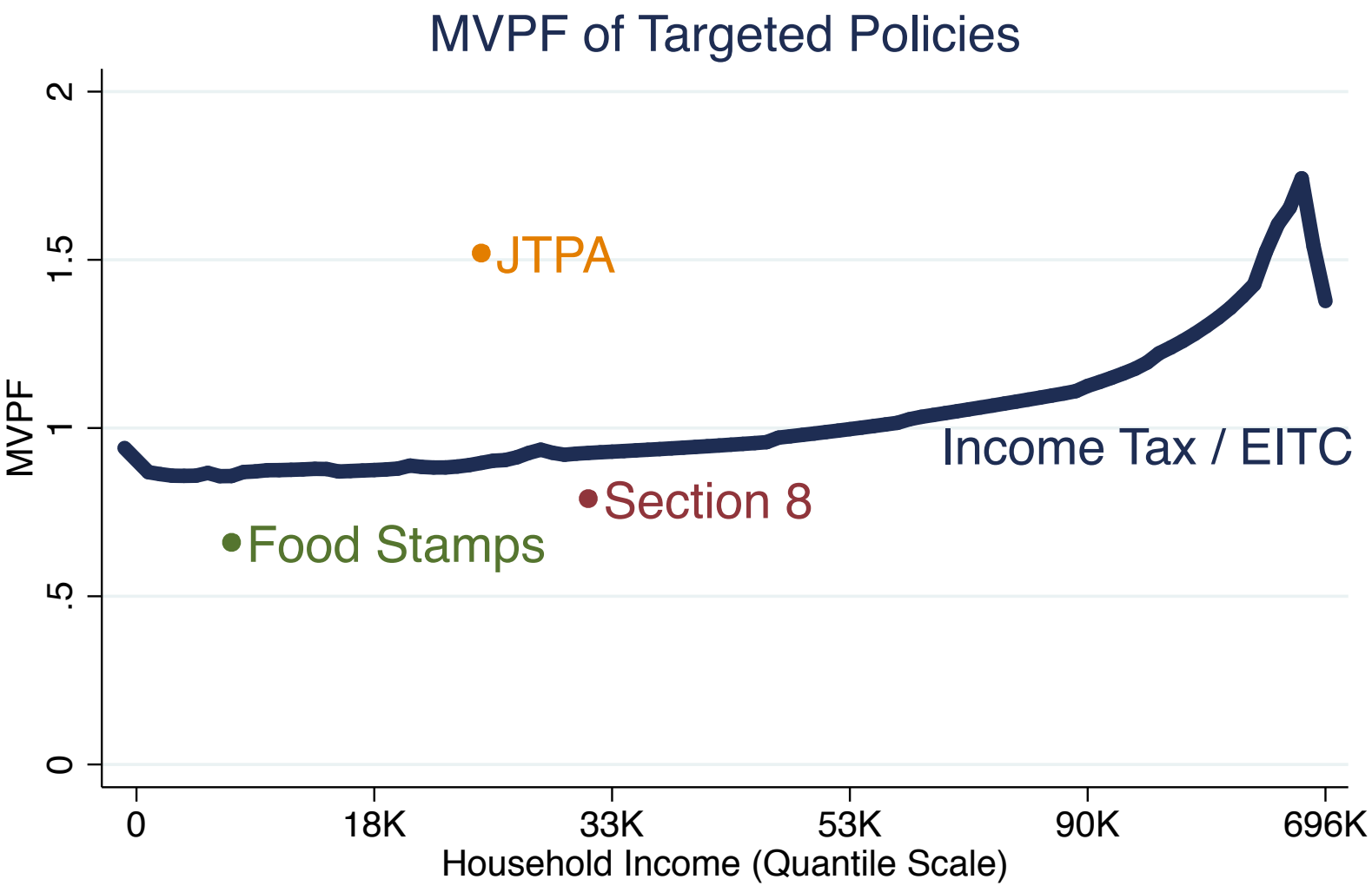
$$MVPF_G = \frac{s(y)}{1 + FE^G}$$

  - WTP per unit gov't revenue (Mayshar 1990; Slemrod and Yitzhaki 2001; Hendren 2013)
  - Depends on causal effects (FE^G) and WTP for non-market good

- Additional spending on G desirable iff

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

Welfare Impact



Source: MVPFs compiled in Hendren (2013) drawing on existing estimates from Bloom et al (1997), Hoynes and Schanzenbach (2012), and Jacob and Ludwig (2012)
Income is average income of policy beneficiaries normalized to 2012 income using CPI-U

Conclusion

- Inequality isn't just a transfer!
- Policy implications
  - Compare policies to the efficiency of the tax schedule
  - Weighting individual WTP by inequality deflator provides method to do this
- **General idea: use marginal costs of feasible redistribution + envelope theorem + Pareto principle instead of a SWF**
- Key question: what policies are more efficient than the income tax schedule at redistribution?