Can a Poverty-Reducing and Progressive Tax and Transfer System Hurt the Poor?

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Scrapping of Reduced VAT Rates Provokes Welfare Debate

Financial Times, May 3, 2015

"When Iceland piled heavier taxes on to food this year, the IMF applauded . . . and urged it to go further.

But the Icelandic Confederation of Labour said the value added tax rise drove up prices and hurt the low paid.

The deputy director of the trade union group said it would fight further reforms: 'This is just one battle,' he added. 'The war is still going on.' "

Motivation: Debate on taxing the poor

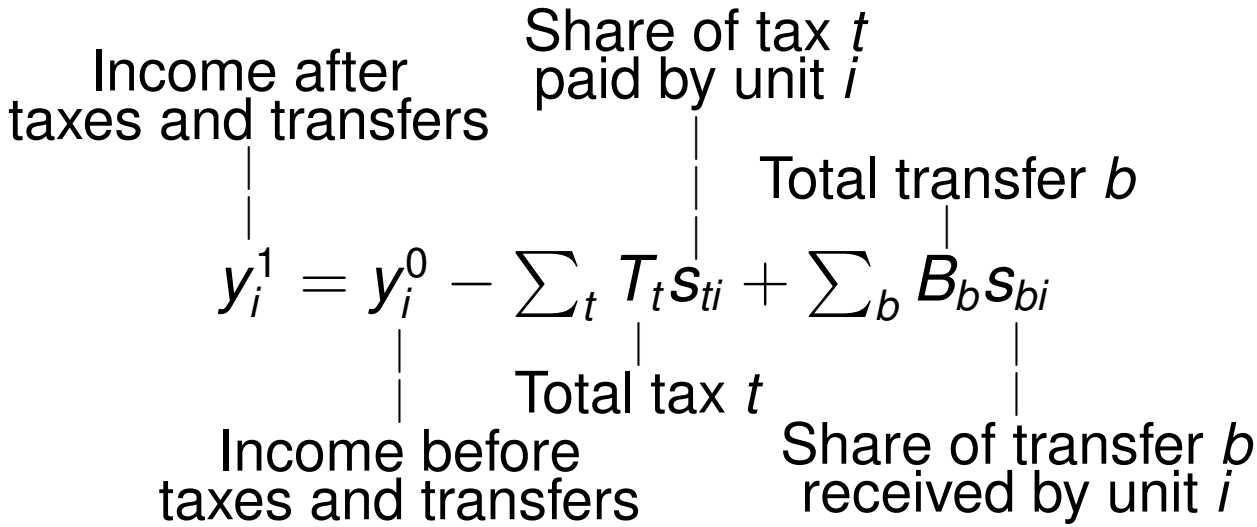
- Preference for efficient taxes (high burden on poor)
  - e.g. no-exemption value added tax
  - "Spending instruments are available that are better targeted to the pursuit of equity concerns" (Keen and Lockwood, 2010)
- Acceptable if sufficiently large transfers to the poor
  - "It is quite obvious that the disadvantages of a proportional tax are moderated by adequate targeting" of transfers, since "what the poor individual pays in taxes is returned to her" (Engel et al., 1999)
  - "A regressive tax might conceivably be the best way to finance pro-poor expenditures, with the net effect being to relieve poverty" (Ebrill et al., 2001)

Suppose you want to know...

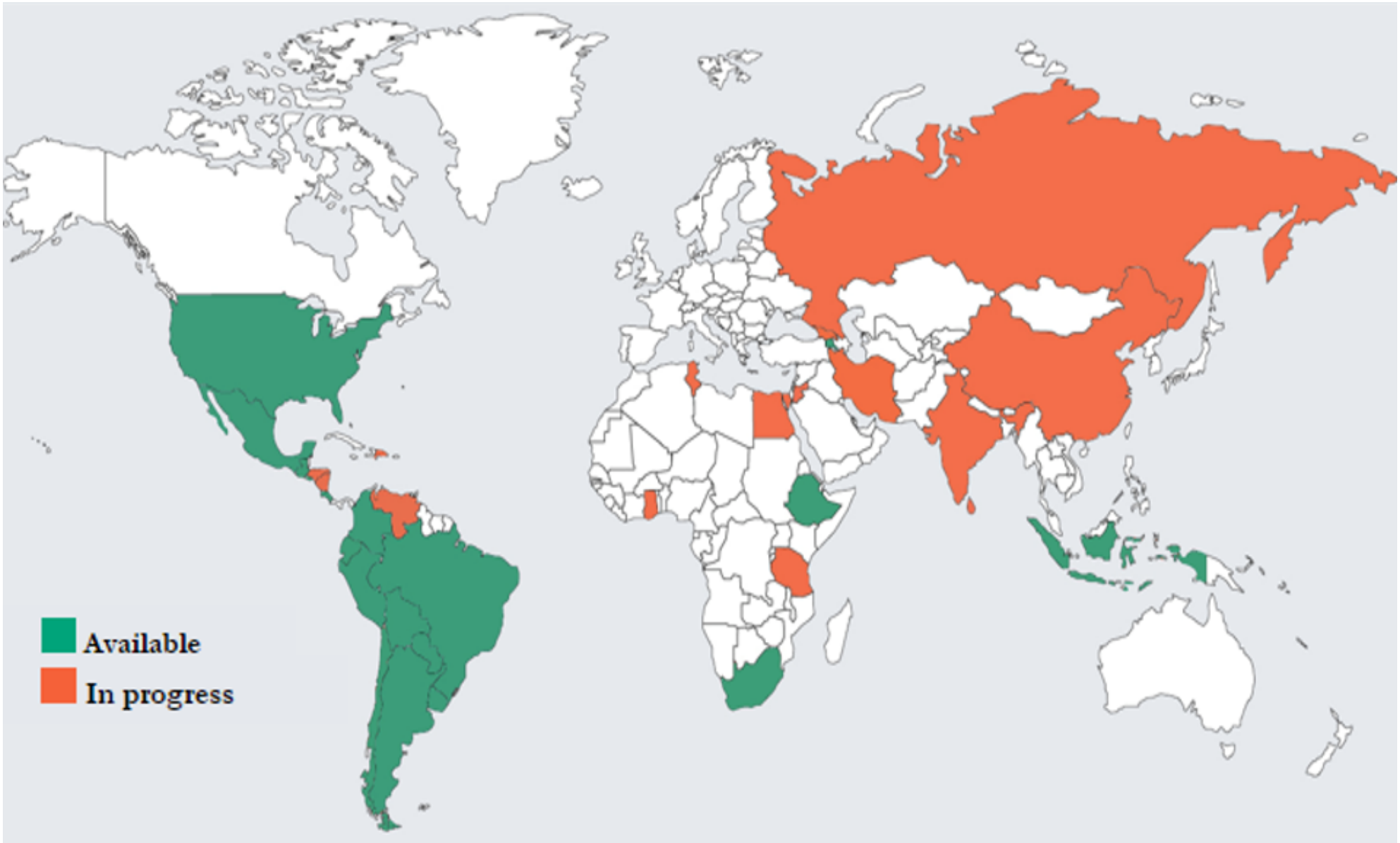
- What is the impact of taxes and cash transfers on the poor?
- How are the poor affected when you eliminate VAT exemptions or energy subsidies?
- Who benefits from the elimination of user fees in primary education or the expansion of noncontributory pensions?

Our measures of Fiscal Impoverishment (FI) and Fiscal Gains to the Poor (FGP) will give you unambiguous and theoretically sound measures

Fiscal Incidence Analysis



www.commitmenttoequity.org



Fiscal Policy, Inequality, and Poverty

- Three distinct questions
  1. What is the impact of taxes and government transfers on inequality?
  2. What is the impact of taxes and government transfers on poverty?
  3. Are the poor impoverished by taxes, net of cash transfers they receive?

Fiscal Policy, Inequality, and Poverty

- A tax and transfer system can be equalizing but poverty-increasing
- In Ethiopia (World Bank, 2015)
  - Taxes and transfers $\downarrow$ inequality
    - Gini $\downarrow$ 2 percentage points or 6.2%
  - But $\uparrow$ poverty headcount
    - \$1.25 PPP per day headcount $\uparrow$ 4.2%
    - \$2.50 PPP per day headcount $\uparrow$ 3.1%
- Caution: Better not to use "regressive" for a poverty-increasing intervention
  - Call it poverty increasing

Fiscal Policy and Impoverishment

- Even if poverty $\downarrow$
  - Poor can be made poorer
  - Or non-poor made poor
- In Brazil ($2.50 PPP per day poverty line)
  - Inequality $\downarrow$
  - Poverty $\downarrow$
  - 40% of post-fisc poor were made poorer (or poor) by the tax and transfer system

Fiscal Impoverishment and Fiscal Gains to the Poor

- There is **fiscal impoverishment** if

Income after taxes and transfers

Poverty line

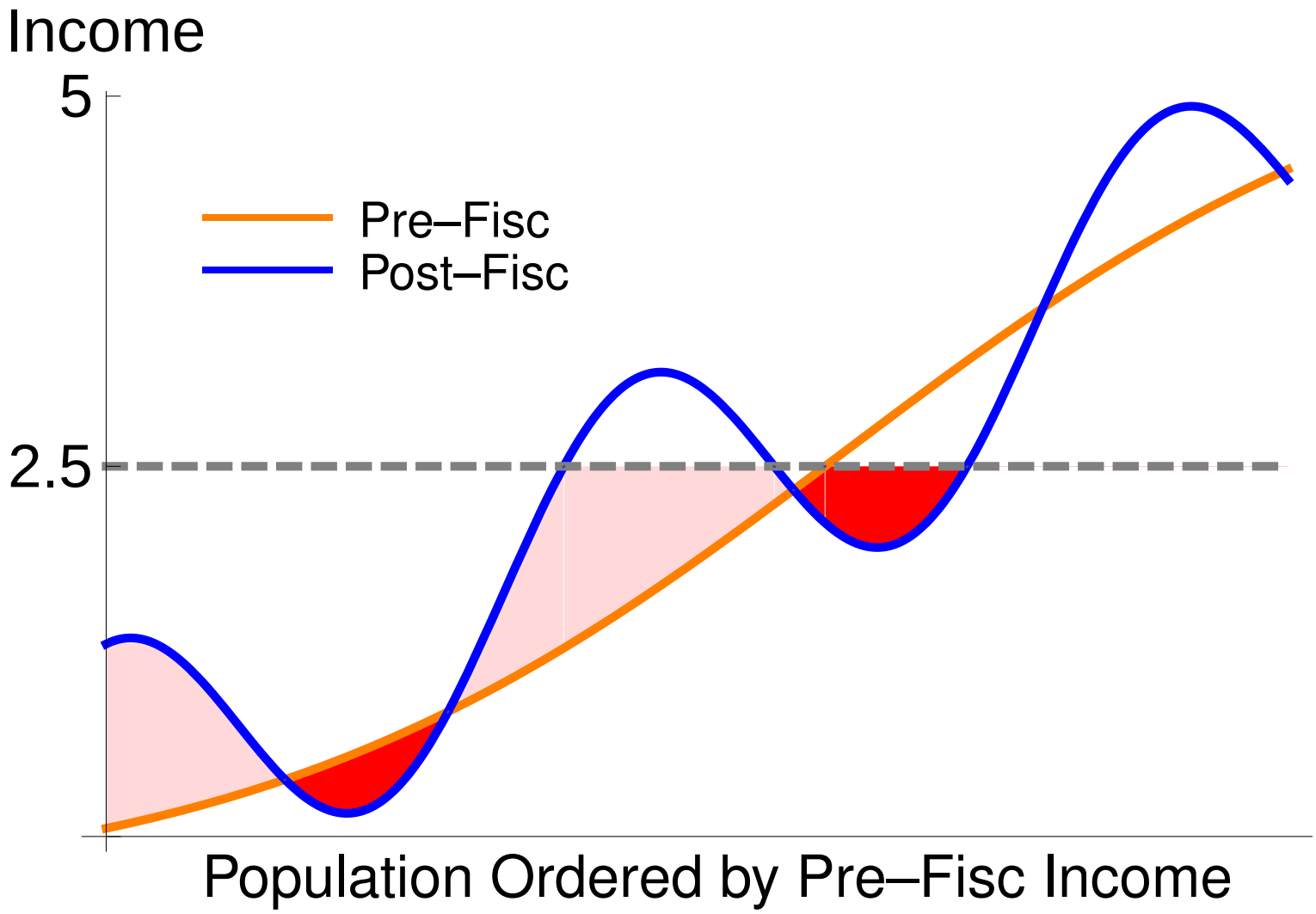
$$y_i^1 < y_i^0 \text{ and } y_i^1 < z \text{ for some } i$$

Income before taxes and transfers

- There are **fiscal gains to the poor** if

$$y_i^1 > y_i^0 \text{ and } y_i^0 < z \text{ for some } i$$

Fiscal Impoverishment and Fiscal Gains to the Poor



Can a Poverty-Reducing and Progressive Tax and Transfer System Hurt the Poor?

1. Measures of whether taxes and transfers hurt the poor
   - Poverty comparisons and stochastic dominance tests
   - Horizontal inequity among the poor
   - Tests for progressivity

   do not tell us if some poor made poorer
   (fiscal impoverishment)

2. Axiomatic measure that *does* capture impoverishment
   - Also: measure of fiscal gains of the poor

3. Illustration with Brazilian data

Stochastic Dominance

- Let F and G be the cumulative distribution functions for two income distributions
- F first order stochastically dominates (FOSD) G

$$\text{if } F(y) \leq G(y) \; \forall \, y$$

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- F FOSD G among the poor
  - $\Leftrightarrow$ Lower poverty under distribution F for broad class of poverty measures, any poverty line
    (Atkinson 1987; Foster and Shorroks 1988)

Stochastic Dominance

- F_1 does not FOSD F_0 among the poor
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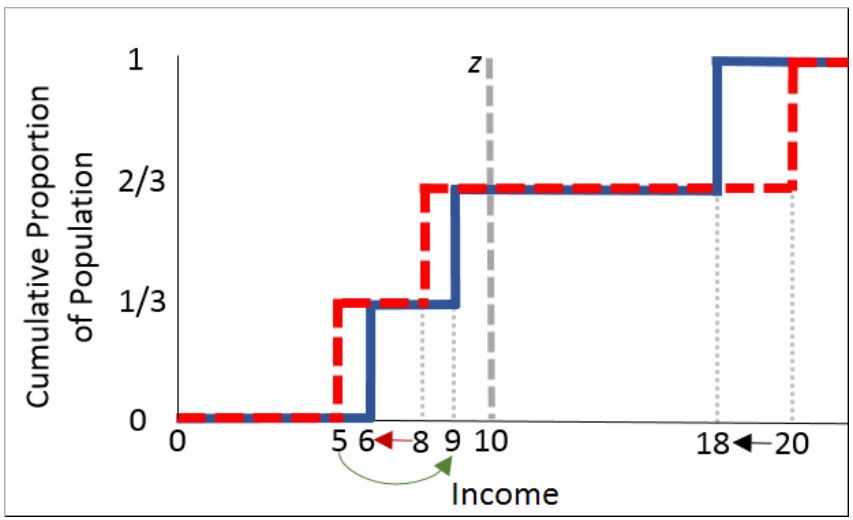
    $\Rightarrow$ no fiscal impoverishment
  - and there is reranking among the poor
    $\Rightarrow$ FOSD is **not a sufficient condition** for no FI

    $y^0 = (5, 8, 20), y^1 = (9, 6, 18), z = 10$

    F_1 FOSD F_0 on $[0, z]$ and there is FI



Horizontal Inequity among the Poor

- Pre-tax and transfer equals treated *unequally* by the fiscal system
  - or individuals reranked by the fiscal system
- Classical horizontal inequity among the poor
  - $y_i^0 = y_j^0$ and $y_i^1 \neq y_j^1$ for some poor (i, j) pair
- Reranking among the poor
  - $y_i^0 > y_j^0$ and $y_i^1 < y_j^1$ for some poor (i, j) pair

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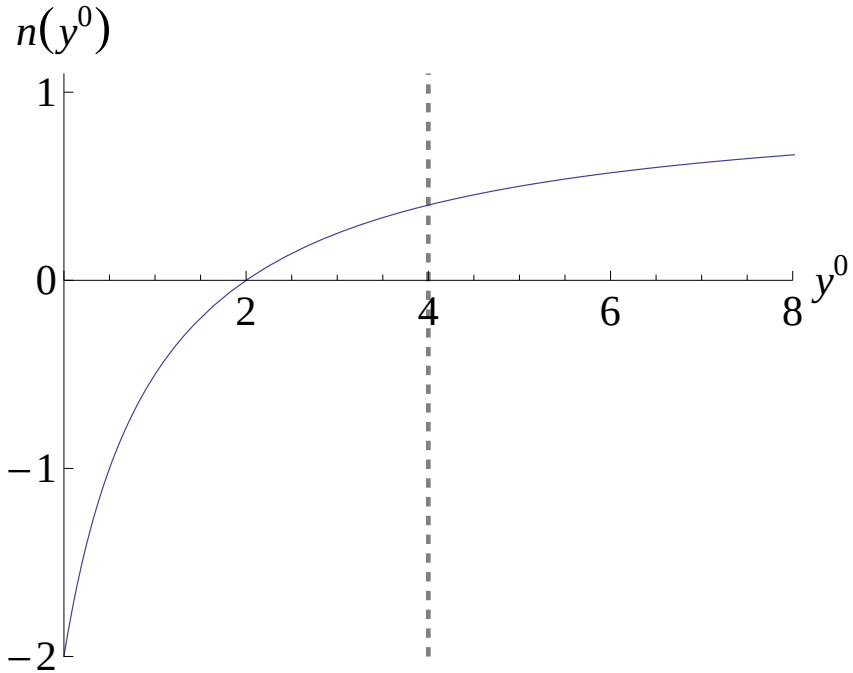
  - $y_i^0 > y_j^0$ and $y_i^1 < y_j^1$ for some poor (i, j) pair
- Horizontal inequity among poor is **neither a necessary nor sufficient condition** for fiscal impoverishment
  - Not necessary:
    $y^0 = (5, 5, 8, 8, 20), y^1 = (6, 6, 7, 7, 20), z = 10$
  - Not sufficient:
    $y^0 = (5, 5, 6, 20), y^1 = (5, 7, 6, 18), z = 10$

Progressivity

- A tax and transfer system is everywhere progressive if taxes net of transfers increase with income
  - $n(y^0)$ is increasing
- An everywhere progressive tax and transfer system is **neither a necessary nor sufficient condition** for no FI.
  - Not sufficient:



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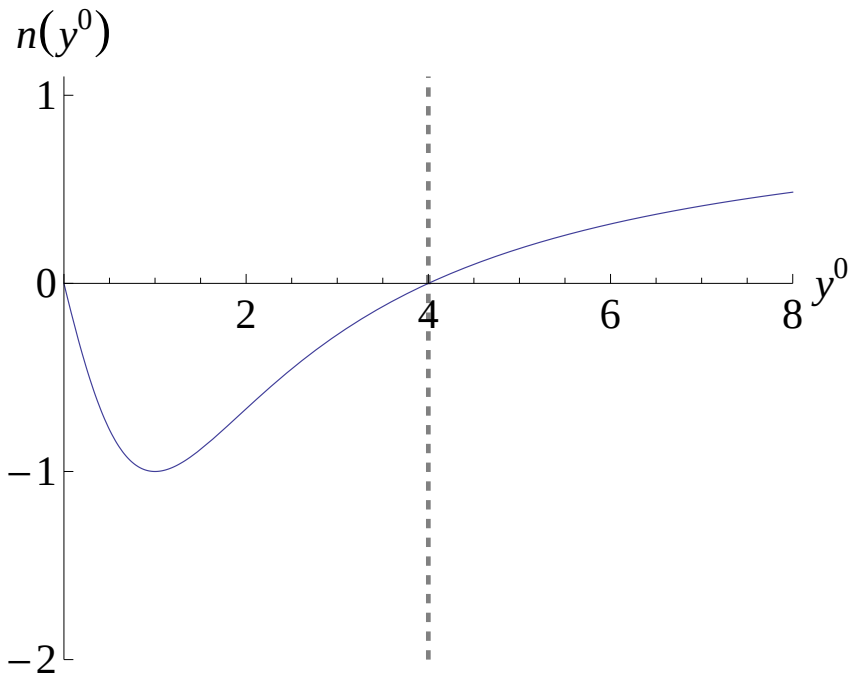

Axiomatic Measure

- Axioms
  - FI Monotonicity
  - Focus
  - Normalization
  - Continuity
  - Permutability
  - Translation invariance
  - Linear homogeneity
  - Subgroup consistency

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  - Subgroup consistency
- A measure satisfying these axioms is uniquely determined up to a proportional transformation

$$f(y^0, y^1; z) = k \sum_{i=1}^{n} \left(\min\{y_i^0, z\} - \min\{y_i^0, y_i^1, z\} \right)$$

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- Pre-fisc poor and impoverished ($y_i^1 < y_i^0 < z$) contributes fall in income, $y_i^0 - y_i^1$
- Pre-fisc non-poor and impoverished ($y_i^1 < z \leq y_i^0$) contributes amount to transfer her back to poverty line, $z - y_i^1$
- Non-impoverished pre-fisc non-poor ($y_i^0 \geq z$ and $y_i^1 \geq z$) contributes $z - z = 0$
- Non-impoverished pre-fisc poor ($y_i^0 < z$ and $y_i^1 \geq y_i^0$) contributes $y_i^0 - y_i^0 = 0$

Fiscal Gains of the Poor

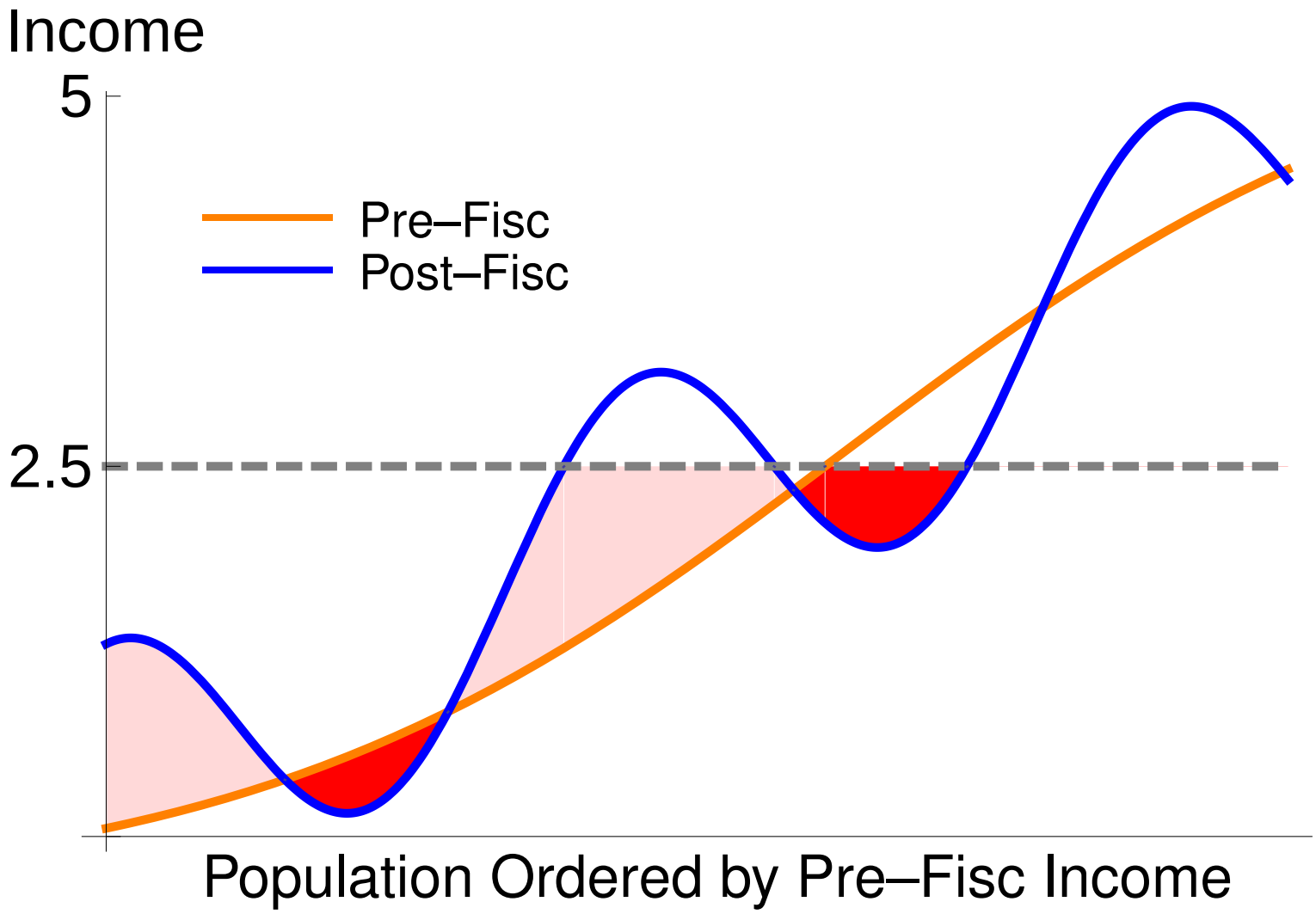
- With analogous axioms for gains of the poor:

$$g(y^0, y^1; z) = k \sum_{i=1}^{n} \left(\min\{y_i^1, z\} - \min\{y_i^0, y_i^1, z\} \right)$$

- Poverty gap can be decomposed into fiscal impoverishment minus gains
  - Poverty gap $p(y; z) = v(n, z) \sum_{i=1}^{n} (z - y_i) \mathbb{I}(y_i < z)$
    - $v(n, z) = 1$ gives total poverty gap
    - $v(n, z) = \frac{1}{zn}$ gives poverty gap ratio

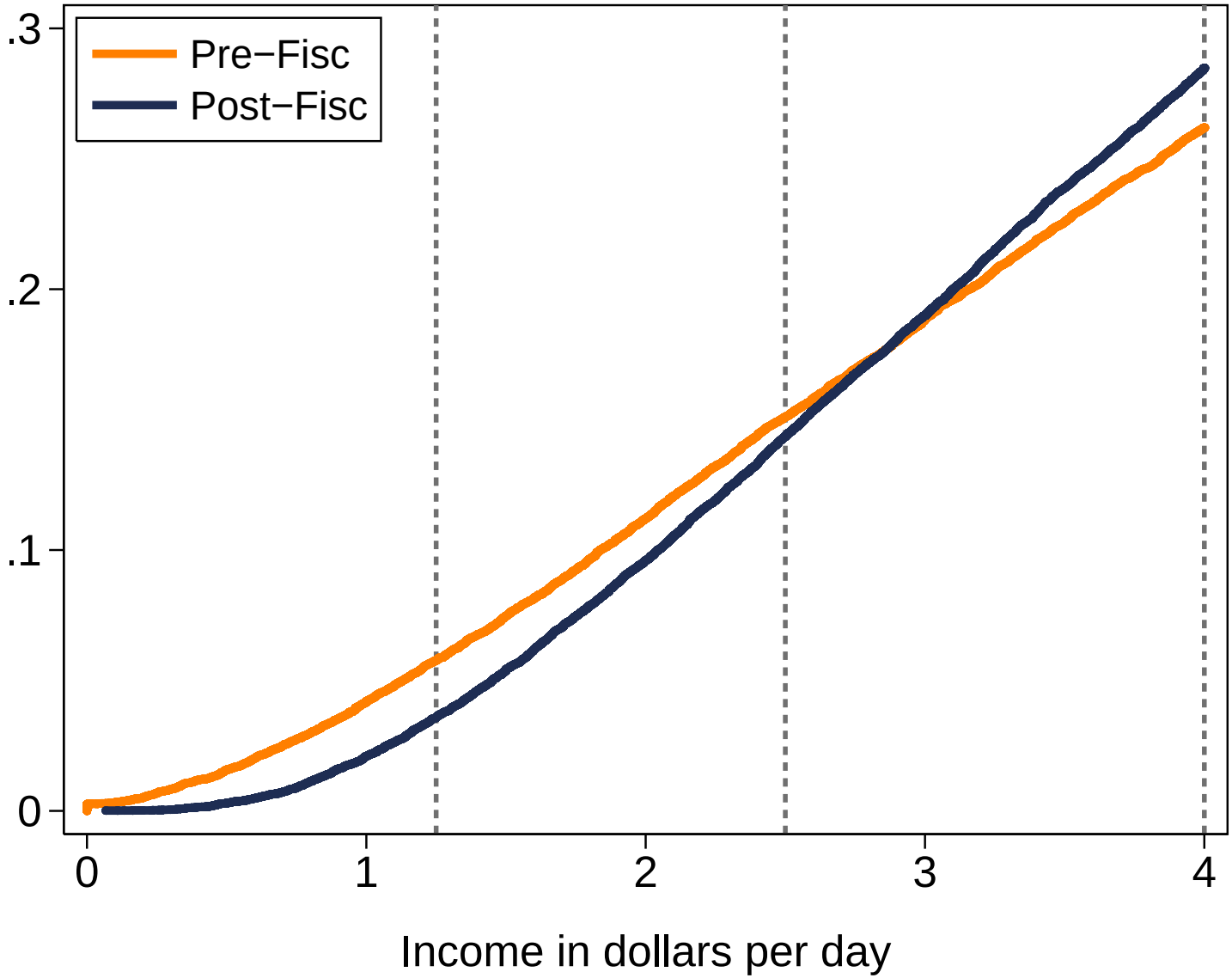
$$p(y^1; z) - p(y^0; z) = \frac{v}{k} \left[f(y^1, y^0; z) - g(y^1, y^0; z) \right]$$

Fiscal Impoverishment and Fiscal Gains to the Poor



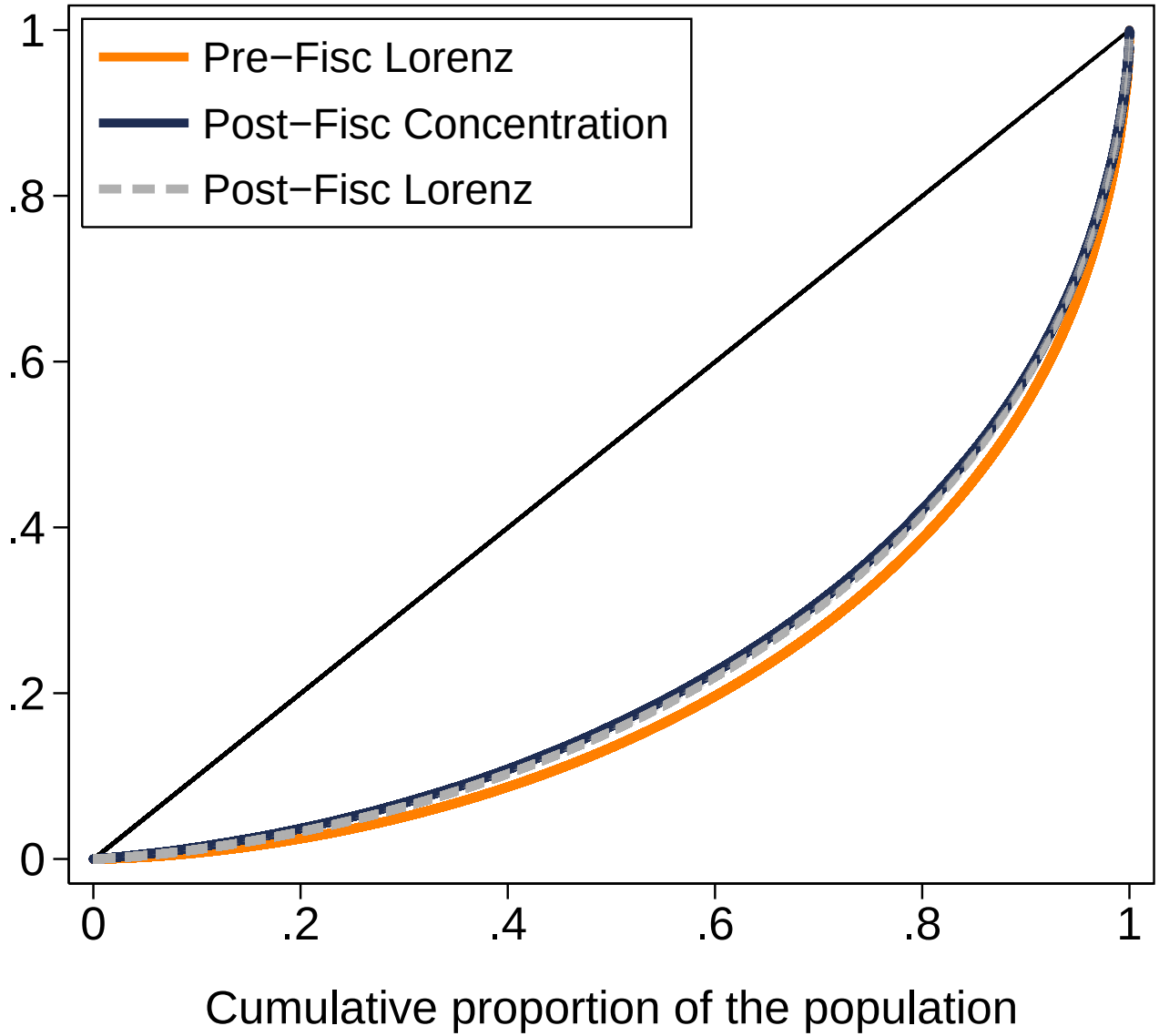
Stochastic Dominance: Brazil

Cumulative Distribution Functions



Global Progressivity: Brazil

Lorenz and Concentration Curves



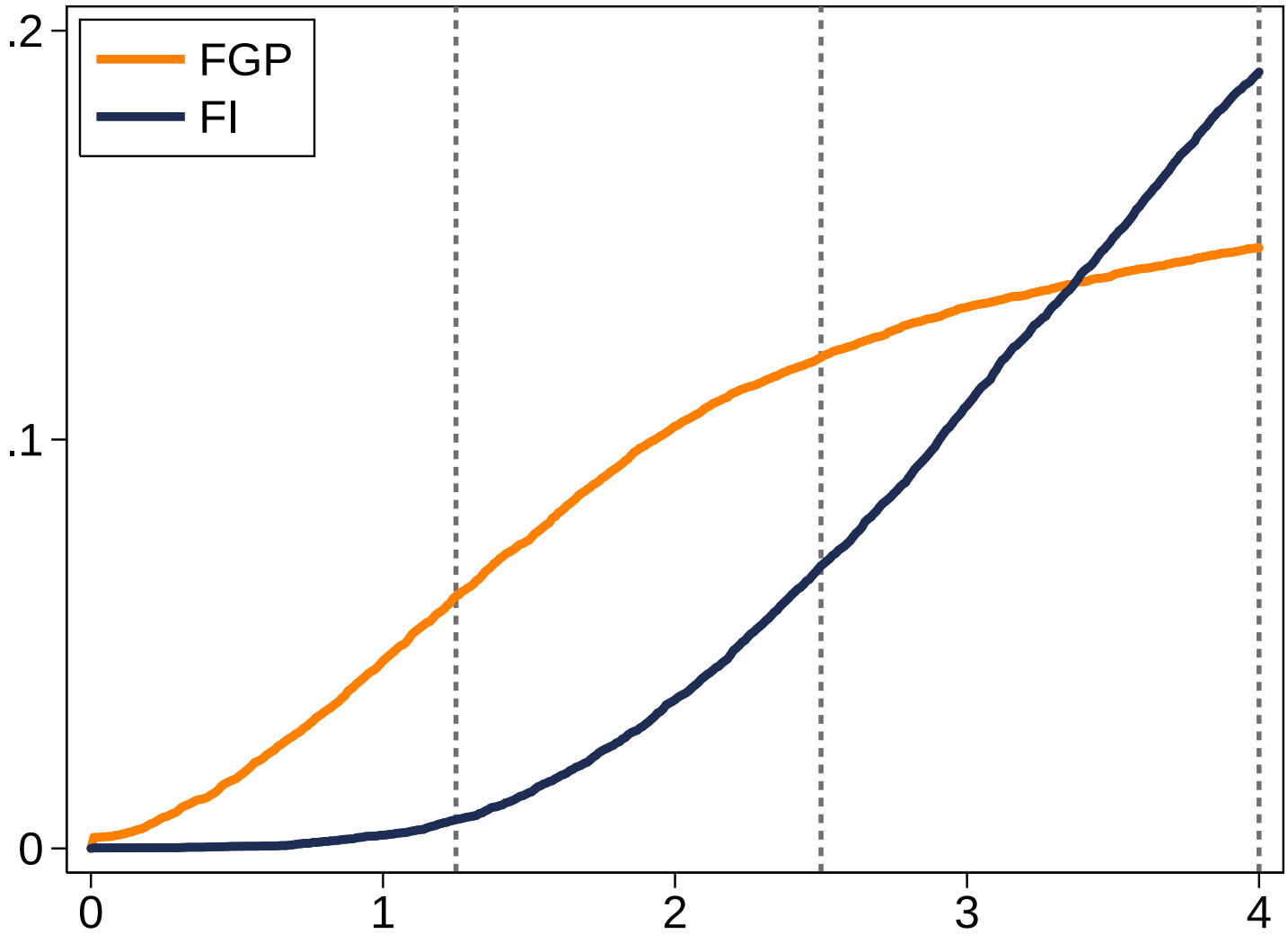
Fiscal Impoverishment: Brazil

$z =$ \$2.50 per person per day

- With $k = 1$, total fiscal impoverishment over \$900 million
  - or 14% of budget of large antipoverty program that reaches 1/4 of population
- With $k = 1/n$, per capita fiscal impoverishment of \$0.01 per day
- Average amount for an *impoverished person* is \$0.19 per day
  - 9% of their income on average

Fiscal Impoverishment: Brazil

Proportion of Population Experiencing FI and FGP



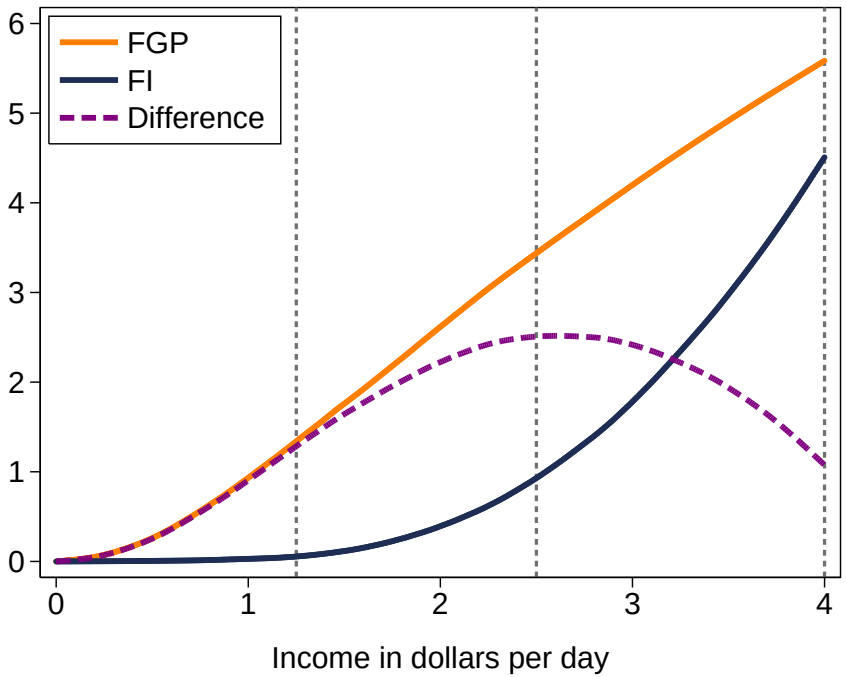
Poverty Gap Decomposition: Brazil

Pre-Fisc and Post-Fisc Poverty Gaps, FI, and FGP

	Absolute totals $k = v = 1$ (US dollars/year)	Normalized $k = v = \frac{1}{zn}$ (Unit free)
$p(y^1; z)$	10,063,263,731	0.0579
$p(y^0; z)$	12,567,596,206	0.0723
$p(y^1; z) - p(y^0; z)$	−2,504,332,475	−0.0144
$f(y^0, y^1; z)$	934,039,521	0.0054
$g(y^0, y^1; z)$	3,438,371,997	0.0198
$f(y^0, y^1; z) - g(y^0, y^1; z)$	−2,504,332,475	−0.0144

Poverty Gap Decomposition: Brazil

Total FI and FGP
(Billions of Dollars Per Year)



Total Poverty Gaps
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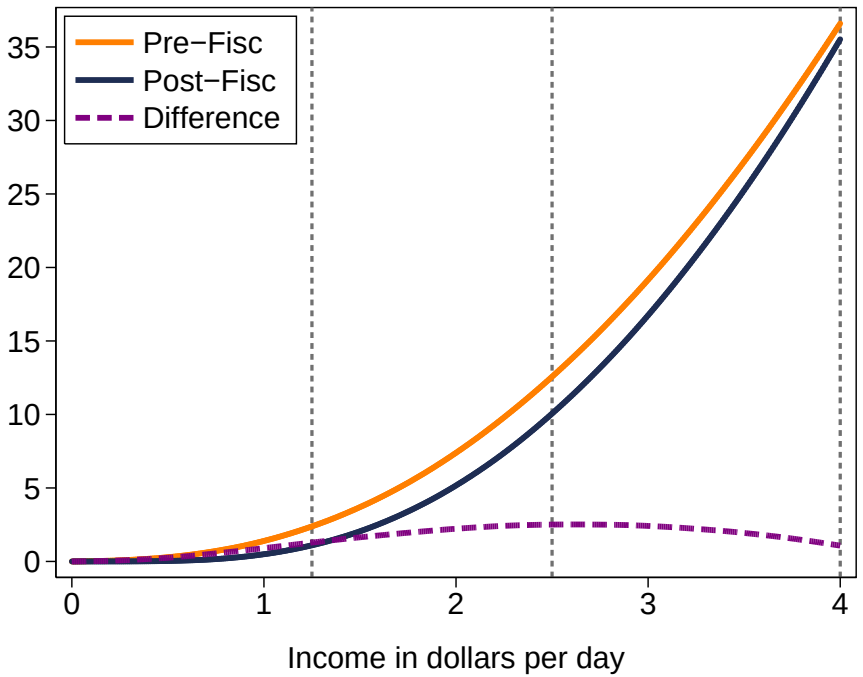

Who are the impoverished? How much would it cost to eliminate?

- Not all excluded from safety net
  - 65% receive Bolsa Família
- On average, more likely to consume highly taxed “vice” goods
- With perfect targeting, elimination would cost 14% of Bolsa Família (a program that costs 0.5% of GDP)
- Issue: How to reach non-Bolsa Família recipients

Sustainable Development Goals

Target 1.6 under Goal One on Poverty

"By 2020 to ensure that government tax and transfer policies do not reduce the consumable income (income after net direct and consumption taxes) of the poor."

—Commitment to Equity team, April 2015