

# Introduction to Distributional Analysis

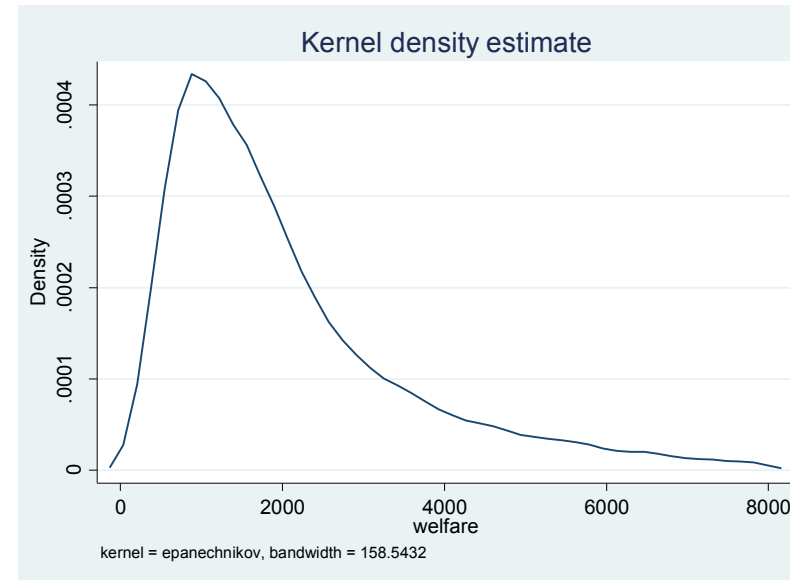
Training Workshop on the  
Commitment to Equity Methodology  
CEQ Institute and The Ministry of Finance

Accra

February 7-10, 2017

# How Do We Describe the Distribution of Income?

- We can graph it:
- We can summarize it in single statistics:
  - Inequality
  - Poverty
- Inequality measures the dispersion of the distribution
- Poverty measures how many people are at the lower (left) end



# Measuring Inequality

- There are many, many inequality measures
- By far the most popular is: Gini coefficient
- Conceptually, the easiest way to understand the Gini coefficient is with a Lorenz curve

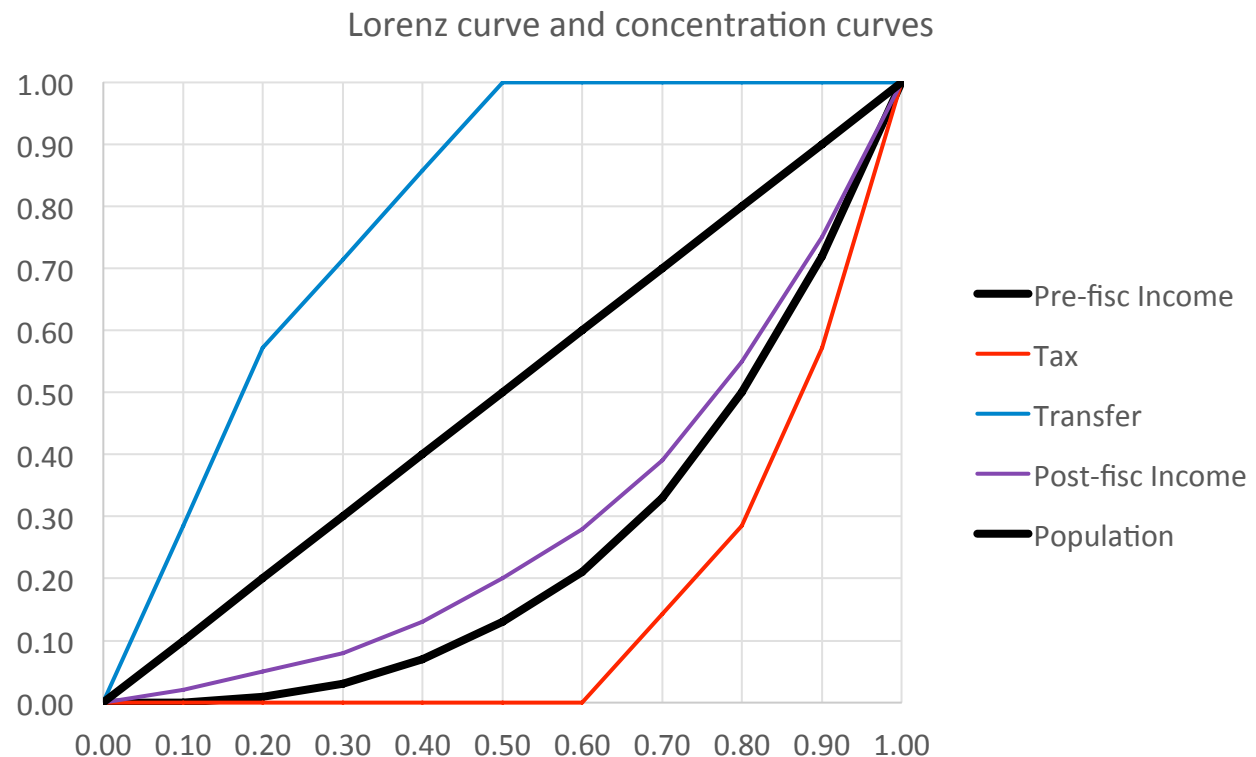


# Measuring Poverty

- There are many, many poverty measures
- By far the most popular is: Foster-Greer-Thorbecke measure (FGT)
- $FGT(\alpha) = 1/n \sum_{i=1}^n ((z - y_i)/z)^\alpha$
- $\alpha$  is a parameter, allowing the measure to vary
  - $\alpha = 0$  gives us the headcount index
  - $\alpha = 1$  gives us the poverty gap index
  - $\alpha = 2$  gives us the poverty severity index

# Assessing the Distributional Consequences of a Tax or Expenditure – Progressivity

- A different approach is to assess the “progressivity” of a tax or expenditure
- One way to do this is via “concentration curves”



# Assessing the Distributional Consequences of a Tax or Expenditure – Progressivity

- We can also calculate a single number summary of the concentration curve: the concentration coefficient
  - Negative values indicate concentration among poorer people, and vice-versa
- A variant on that is the Kakwani index:
  - concentration coefficient - Gini coefficient
- NOTE: these measures are independent of the size of the tax or expenditure. They only measure concentration or “targeting”

# Assessing the Distributional Consequences of a Tax or Expenditure – Marginal Effects

- One intuitive measure is the amount that inequality changes when we add or subtract that item to/from income
  - CEQ calls this the “marginal contribution (effect)”
- It seems like we can have a large marginal contribution if:
  - the tax or expenditure is well-targeted
  - the tax or expenditure is large
- But careful! Your intuition may be wrong.

# Assessing the Distributional Consequences of a Tax or Expenditure – Impoverishment and Enrichment

- Standard poverty (and inequality) measures are “anonymous”
- Even if a tax/expenditure combination leaves poverty unchanged, it may well make some people poorer (“impoverish” them) and others richer (“enrich them”)
- Lustig and Higgins produce measures of these effects
  - Paper reproduced in the CEQ Handbook, ch.4



# Assessing the Distributional Consequences of a Tax or Expenditure – Effectiveness of a Tax or Expenditure

- Two basic approaches
  - Compare how much a tax or expenditure reduces poverty or inequality to how much a “perfect” tax or expenditure *of the same size* could reduce poverty or inequality
  - Ask how much “bang for the buck” we get from a tax or expenditure: how much does the poverty gap decline divided by the total amount of the tax or expenditure

# Assessing the Distributional Consequences of a Tax or Expenditure – Other Approaches

- “Pro-poor”
  - Do the poor get absolutely (or relatively) more of a benefit, or pay less of a tax?
- Quintile or decile shares or averages
  - Simple tables
  - The shares are just a summary of the Lorenz and concentration curves
- Many more
- Be cautious. There are exceptions to your intuition when dealing with many items together

# Assessing the Distributional Consequences of a Tax or Expenditure – An Example

- Please see `inc_dist.xlsx` for numerical examples and calculations