Separate but Unequal: The Nature of Income Inequality in U.S. Metropolitan Statistical Areas

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Population Association of America
Washington, DC
March 31-April 2, 2016

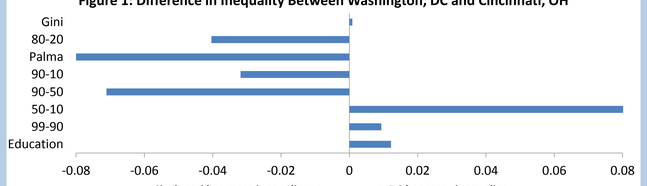
INEQUALITY METRICS

- Gini Index = a statistical measure of income inequality ranging from 0, perfect equality, to 1, perfect inequality.
- Education = Gini Index for educational attainment instead of income.
- Palma ratio = ratio of top 10% share of total income to lowest 40% share of total income.
- 80-20 ratio = income at 80th percentile divided by income at 20th percentile.
  - Same methodology for 90-10 ratio, 90-50 ratio, 50-10 ratio, and 99-90 ratio.

INTRODUCTION AND MOTIVATION

- The Gini Index is a widely cited measure of income inequality. However, though it offers ease of interpretation, it sacrifices a lot of information. In Figure 1, Washington DC and Cincinnati, OH have Gini indexes that are not statistically different from one another, but still have different income distributions.
- To that end, eight inequality metrics are calculated and compared to one another in order to examine how the use of a particular metric impacts our understanding of economic well being.

Figure 1: Difference in Inequality Between Washington, DC and Cincinnati, OH



Note: 99-90 and Education are not statistically different from each other. Difference between Gini Indexes is not statistically significant.
Source: 2014 American Community Survey

DATA

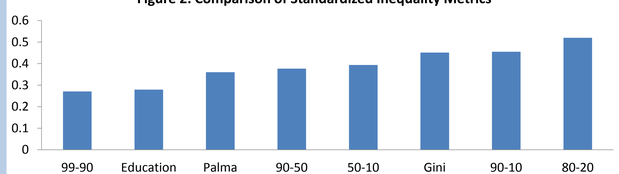
- Metropolitan Statistical Area (MSA) data (N=381): Sperling's Best Places, Bureau of Economic Analysis (BEA) regional price parities, and BEA Regional Economic Accounts.
- Household level data (N=1,646,168): heads of households living in identifiable MSAs from the 2014 American Community Survey** one-year data.
- Main variable of interest is after-tax household income:
  - Adjusted by size and composition of household.
  - Deflated by MSA cost of living using BEA regional price parities.
  - Federal and state taxes are calculated using the NBER TAXSIM program.
  - Transfer payments (supplemental security income, social security, and public assistance) are included in household income.

Note: All graph estimates are statistically different from zero and from one another unless otherwise noted. Replicate weight standard errors are used. Estimates differ from published ACS Gini estimates.
**For more detail on the ACS, including its sample size and questions, see www.census.gov/acs.

COMPARISON OF INEQUALITY METRICS

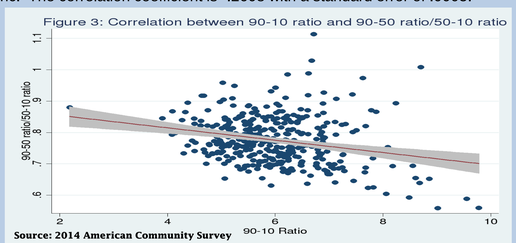
- In Figure 2, the eight different inequality metrics are compared on the same scale.

Figure 2: Comparison of Standardized Inequality Metrics



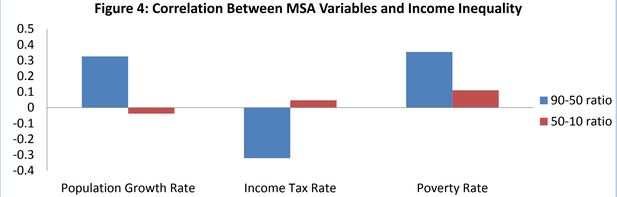
Note: Estimates are based on the weighted average of inequality metrics in 381 MSAs.
Metrics were standardized using the following formula: X_standard = (x – min(X))/(max(X)-min(X))
Source: 2014 American Community Survey

- Figure 3 is a scatter plot of the 90-10 ratio and a ratio of the 90-50 metric to the 50-10 metric. The correlation coefficient is -.2608 with a standard error of .0005.



- In Figure 4, the 90-50 ratio and 50-10 ratio produce very different results.

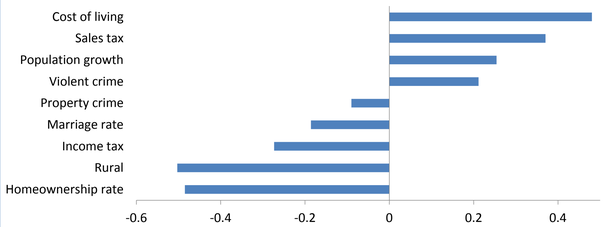
Figure 4: Correlation Between MSA Variables and Income Inequality



Source: 2014 American Community Survey, Sperling's Best Places, and U.S. Census Bureau Annual Estimates of the Resident Population

INEQUALITY METRICS AND ECONOMIC WELL-BEING

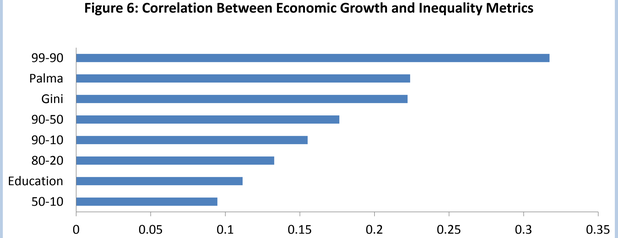
Figure 5: Correlation Between the Palma Ratio and MSA characteristics



Note: Charts using other inequality metrics show similar patterns, aside from results in Figure 4.
Source: 2014 American Community Survey, Sperling's Best Places, and U.S. Census Bureau Annual Estimates of the Resident Population

- Figure 5: MSAs with higher inequality are associated with:
  - Higher sales tax rates and lower income tax rates.
  - Higher violent crime, higher cost of living, and higher population growth.
  - Lower property crime, a lower percentage of the MSA living in rural areas, a lower percent of married population, and a lower homeowner population.

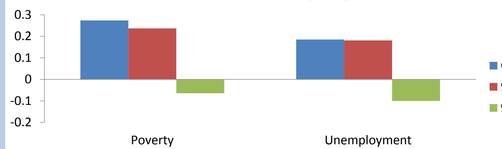
Figure 6: Correlation Between Economic Growth and Inequality Metrics



Source: 2014 American Community Survey and BEA Regional Economic Accounts

- Figures 6 and 7: conclusions about economic growth, poverty, and unemployment are largely dependent on the inequality metric used.
  - In Figure 6, all metrics have a positive association, but the strength of that association varies widely.
  - In Figure 7, higher inequality at the top of the income distribution is associated with lower poverty and unemployment. This runs counter to the result at other parts of the income distribution.

Figure 7: Correlations Between Poverty and Unemployment with Several Income Inequality Metrics

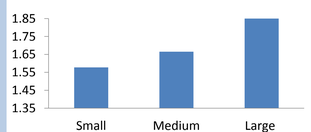


Source: 2014 American Community Survey

DISCUSSION

- There are two main objectives in calculating the eight income inequality metrics. The first is to examine the level of income inequality in MSAs in the United States. A significant amount of variation is found in income inequality, much of which depends on MSA size.
- Bigger MSAs have more heterogeneity. Income inequality is significantly higher in MSAs with larger populations.
- Large: population > 1 million people (53 MSAs)
- Medium: 250,000 < population < 1 million (132 MSAs)
- Small: population < 250,000 (196 MSAs)

Figure 8: Palma Ratio and MSA Size



Note: The same pattern holds with other inequality metrics.
Source: 2014 American Community Survey and U.S. Census Bureau Annual Estimates of the Resident Population

- The second objective is to examine how the use of different metrics can lead to different conclusions.
  - The Gini Index is often used to capture income inequality. Based on Figure 2, a person may draw far different conclusions and see far different results if the 80-20 ratio is used or if the Palma ratio is used.
  - Similarly, different outcomes are found when different metrics are used in Figure 4.
  - No judgements are made about one metric being superior to another. The main point is that each metric looks at a different part of the income distribution so they should be used in concert with one another.

FUTURE WORK

- Look at consumption inequality, how consumption inequality compares to income inequality, and how consumption inequality relates to economic well-being using different inequality metrics.
- Examine how income inequality and consumption inequality change over time using different inequality metrics.

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