#38 – Global Geospatial Inequality Measures

Short description

Type of object: Dataset
Source (organisation): NASA – SEDAC
Issues: Gini coefficient
Time Span: 1992-2013
Geographical coverage: 234 countries and territories
Link: https://www.ciesin.columbia.edu/data/global-geospatial-inequality/

Note/Interpretations

"The past decades have witnessed a significant increase in economic inequality with important social and economic consequences. As a result, the study of inequality gained relevance within the economics profession, both in terms of studying determinants of inequality and the implications of rising inequality. However, one important constraint in the study of inequality is the limited availability of consistent data and measurements at a global scale. Sources and methods used to construct global databases of inequality tend to vary substantially in quality and availability across countries and within countries over time. This is particularly problematic in developing countries, which are more prone to poverty and inequality.
The Global Geospatial Inequality Measures (GGIM) data are available in an Excel Workbook.
These measures collected are constructed using worldwide geospatial satellite data on nighttime lights emission as a proxy for economic prosperity, matched with varying sources of data on geo-located population counts.
The night lights data are obtained from the Earth Observation Group (EOG) at the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI). We use the data based on the Operational Linescan System (OLS) instruments, particularly, the unfiltered version of the data (average visible) that accounts for more sparsely populated regions that tend to emit less stable lights. In order to translate light intensities into measures of economic prosperity, we adapt a constant elasticity approach to be uniformly applied at the pixel level. Here, the relationship between lights and prosperity is regulated by an exponential scaling parameter. This relationship is calibrated through an agnostic approach using available measures of income inequality and their corresponding quality assessment as a reference.
For the calculation of light-based Gini-coefficients, two sources of population data are considered. The first is the Gridded Population of the World (GPW) dataset, produced by the Center for International Earth Science Information Network (CIESIN). The GPW is constructed on the basis of population census data, collected from hundreds of organizations that include national statistics offices and other mapping agencies, matched to spatially explicit administrative boundary data. The second source is the LandScan (LSC) database, produced by the Oak Ridge National Laboratory. In contrast to the GPW, the LandScan data are based on a multi-variable mapping approach that disaggregates census counts within administrative boundaries with the support of ancillary data, such as land cover, roads, slope, urban areas, village locations, and high-resolution imagery.
The combination of these sources of nightlights and population data yields several geospatial inequality measures. In order to obtain a parsimonious composite inequality measure, these geospatial Gini-coefficients are combined by weighting them to maximize their correlation with a benchmark income inequality measure. For that purpose, the Standardized World Income Inequality Database (SWIID) is adopted as a reference. The weighting is regulated by a parameter (lambda) that can be tuned to yield greater cross-country (L100 in the data file) or within-country (L000) correlations with income inequality. Measures between these two extremes are also provided, with a recommended calibration of lambda=0.5 (L050)."
Further information on the measurement of inequality using geospatial data are available in: Jaqueson K. Galimberti, Stefan Pichler, Regina Pleninger, Economic Working papers series, Measuring Inequality using geospatial data, 2020,

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