

Top Lights - Bright Spots and their Contribution to Economic Development

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Paper Abstract:

Satellite data on nighttime luminosity are an increasingly popular proxy for economic activity, but their utility for analyzing comparative development across the globe is severely limited by top-coding. The commonly used satellites do not accurately capture the brightness of large and densely populated cities. As a result, they underestimate differences between urban and rural regions, as well as developed and developing countries. Our main contribution is to propose a new and easy-to-use procedure to correct for top-coding of the lights data. We show that, like top incomes, top lights are Pareto distributed. On this basis, we derive simple formulas for the top-adjusted mean and spatial Gini coefficient. Furthermore, we develop simulation methods to correct the data at the pixel level. Our top-coding correction raises the worldwide Gini coefficient of spatial inequality in lights by about 9 percentage points. This rather large increase underlines the importance of big cities for global economic activity. We present further applications to show that top-coding affects estimates of the income elasticity of light, urban-rural differences, and regional or ethnic inequalities.