PROJECT BRIEF

IAESAT: economic activity measured with satellite night lights

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2026 · version 1.1

Can subnational economic activity be measured where timely or reliable statistics are missing?

PURPOSE

In much of Latin America official statistics arrive late: quarterly national accounts are published with months of lag, subnational detail is scarce and, in the extreme case of Venezuela, GDP stopped being published regularly. IAESAT turns night-time luminosity into a measurement system with three deliverables: **(i)** a monthly activity index for 8 economies in the region, plus Venezuela; **(ii)** a GDP-weighted regional aggregate; and **(iii)** the same index with subnational detail for ~150 administrative regions.

DATA AND CONSTRUCTION

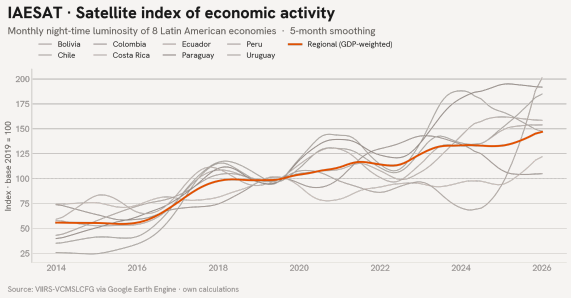
- VIIRS night-lights imagery processed in Google Earth Engine.
- Country-specific cloud-cover thresholds; filtering of moonlight and extreme values; masking of gas *flaring* from oil fields.
- STL decomposition in logs and indexing to base 2019 = 100.
- Two-level aggregation: an own series per administrative region and a national index that weights those regions; the regional aggregate weights countries by their GDP.

TOOLS

Python and Google Earth Engine (geospatial processing at scale, with partitioning for large countries), pandas for the panels, matplotlib and geopandas for the figures.

LIMITATIONS

Night lights capture urban, energy-intensive activity best: in commodity-exporting economies, where value added is generated in mines and wells that emit little light, the national signal is weaker. Results also depend on the quality of the official GDP used as a reference.



Satellite activity index by country and GDP-weighted regional aggregate (orange), monthly, base 2019 = 100. Source: VIIRS-VCMSLCFG via Google Earth Engine · own calculations.

MAIN RESULT

Monthly economic activity for economies where the official figure arrives late or not at all, with **subnational detail for ~150 regions** — including Venezuela, whose collapse and partial recovery took place, largely, with no official statistics to record them.

FUTURE WORK

Explore other satellite tools, such as NASA Black Marble, and validate the index month by month against official activity indicators. Exploit the subnational panel: regional convergence and an anatomy of the COVID-19 shock region by region.

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