

Nowcasting Global Poverty

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Motivation

- Timely poverty estimates are vital to allocate resources and track SDG 1.1.

IMF approves aid for world's 28 poorest countries

BY FRENCH PRESS AGENCY - AFP | NEW YORK | FINANCE | OCT 06, 2020 | 8:55 AM GMT+3



- Yet, on average across the developing world, the most recent survey with poverty data is from 2015.
- 16 countries have no poverty estimate at all.

Recent advances

- Recent papers used satellite imagery and OpenStreetMap to predict timely granular estimates of poverty (or wealth) with high accuracy.

PNAS 🔍

RESEARCH ARTICLE | ECONOMIC SCIENCES f t in

Microestimates of wealth for all low- and middle-income countries

Guanghua Chi , Han Fang, Sourav Chatterjee, and Joshua F. Blumenstock  [Authors Info & Affiliations](#)

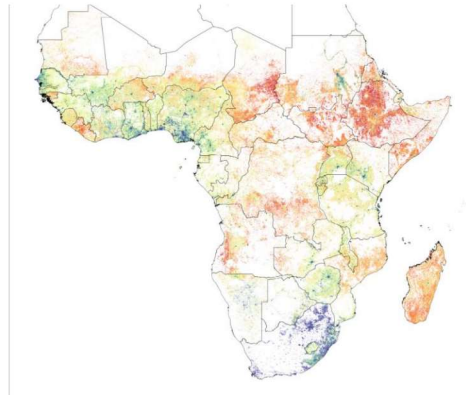
Edited by Jose Schenkman, Department of Economics, Columbia University, New York, NY; received July 24, 2021; accepted November 14, 2022

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14,233  

Significance

Many critical policy decisions rely on data about the geographic distribution of wealth and poverty, yet only half of all countries have access to adequate data on poverty. This paper creates a complete and publicly available set of microestimates of the distribution of



Objective

- Test various methods to nowcast extreme poverty in all countries of the world as of the present year.
- Test how complex machine learning models with new data sources compare against more simple nowcasting models

Is accuracy all we should care about?

Criteria for evaluating different methods

1. Accuracy
2. Simplicity
3. Credibility
4. Ease of implementation
5. Stability

Training data

- Use 2000+ poverty estimates from the World Bank's Poverty and Inequality Platform

	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
Lithuania		0		0.3	0.3	0.2	0.6	0.5	0.2	1.4	1.8	1.5	1.3	0.8	2.2	1.5	0.7	0.9	0.7	1.3	0.7	1.3	1	0.9	0.5			
Bangladesh		35				34					25					19						14						
Turkmenistan				50																								

Loss function: Mean absolute deviation in pct. points

$$Loss = \sum^C w_{country} * |poverty_{country,time}^{true} - \hat{poverty}_{country,time}|$$

Complex models

Features

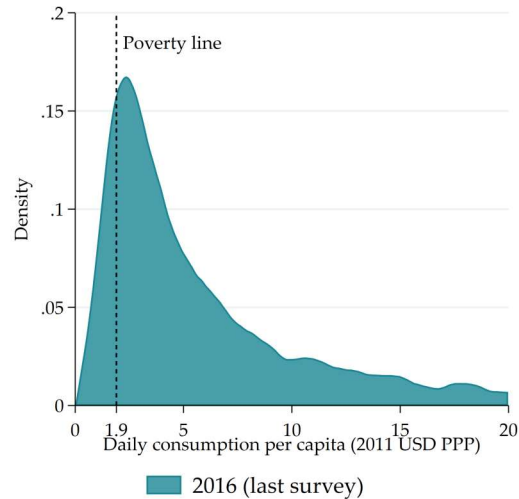
- World Development Indicators
- World Economic Outlook
- Google Earth Engine (nighttime lights, rainfall, land surface temperature, impervious surface, cropland, normalized difference vegetation/snow/water index)

Algorithms:

- Lasso
- Post-lasso
- CART random forests
- Conditional inference random forests
- Gradient boosting

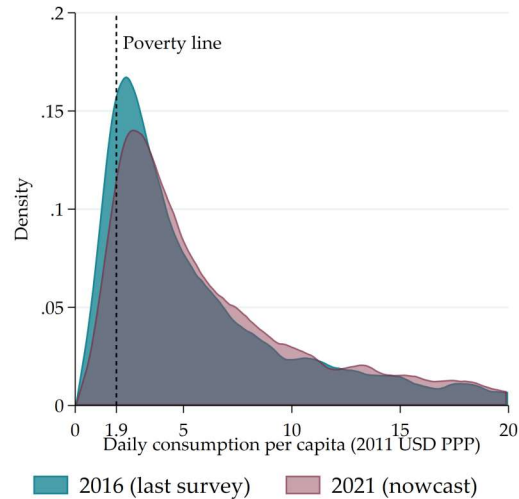
Simple models

- Leverage that there is a tight relationship between income from national accounts and income measured in household surveys

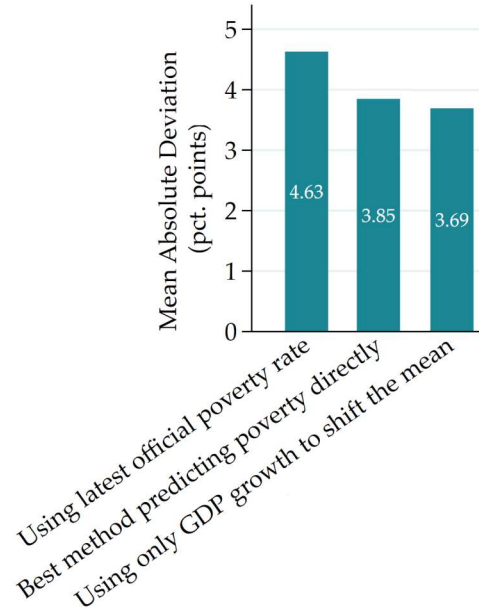


Simple models

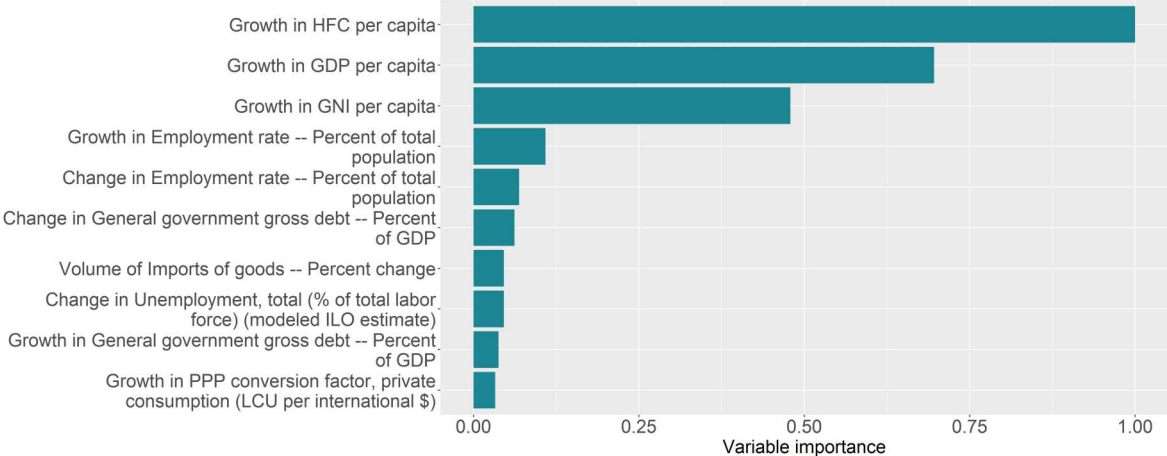
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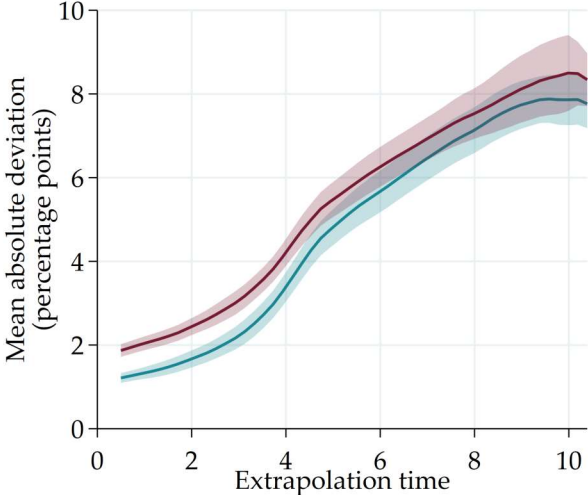
1000 features vs. GDP



Feature importance



No data vs. old data



- GDP growth
- Best model that predicts poverty rates directly

Final reflections

- Non-traditional data sources may give higher accuracy in nowcasts of SDG indicators.
- But sometimes the increased accuracy may not be worth the trouble.
- It may come down to the particular application and the purpose of providing up-to-date data.