

# **Economic Inequality**

## **Traditional and Computational Perspectives**

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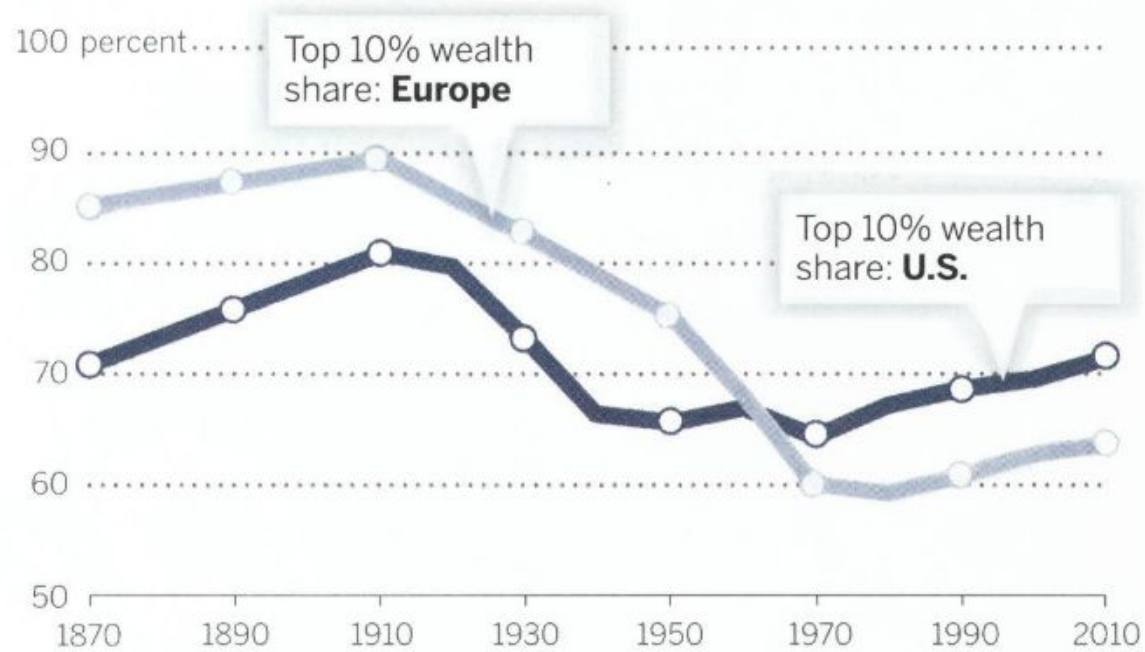
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# Introduction

## Wealth inequality in Europe and the United States, 1870–2010

Share of top wealth decile in total net wealth



## Wealth-to-income ratios in Europe and the United States, 1900–2010

Market value of net private wealth (% national income)



# Introduction

**Income and wealth inequality widely exist and keep growing.**

**Income and wealth inequality is a data-rich field**

# Measurement: Datasets

## Official Dataset

- Bourguignon (2002) - GDP per capita in 33 countries from 1820 to 1992
- Sala-i-Martin (2006) – GDP per capita data
- Bhalla (2002) – GDP per capita, national account

## Private Sector

- Sala-i-Martin (2006) – Household survey data, 216 countries
- Piketty (2019) – Hurun Rich List, income from most wealthy groups

# Measurement: Index

## GDP Per Capita/Consumption Index

- Adjusted using Global Exchange Rate or Parity Purchasing Power Index (Anand et al. 2008)

## Income/Wealth Percentiles and Share

- Picture the dynamic and difference among groups (Piketty et al. 2019, Lakner et al. 2016)

## Other Indexes

- Gini Coefficient, Theil T, Theil L, Variance of log-income

# Measurement: Problems

- Official data is not always available
- To better understand inequality, we need to incorporate alternative data sources and forms

# Theory: Economic

## Nature of Inequality

- Roemer et al. (2016) – **Income inequality = Opportunity inequality**

## Origin of Inequality

- Solow (1956) – **Production**. Labor, capital and human resource can be the major contributors.
- Kalleberg et al. (1981) – **Segmentation**.
- Piketty et al. (2015) – **Distribution and Capital**.

# Theory: Sociology

## Origin of Inequality

- **Wolff & Zacharias, 2013 - Marx Theory** (income disparities due to the class position)
  - Not comprehensive enough (Robinson & Kelley, 1979)
  - Ignoring intra-class inequality in the modern societies
  - Under-conceptualization of the middle class
- **Bendix, 1974 - Weber Approach** (focus on the market power of individuals)




# Computational Social Science

- **New data and new methods**
- **Both fronts: empirical and theoretical**

# Observation with Big Data

## Image Data

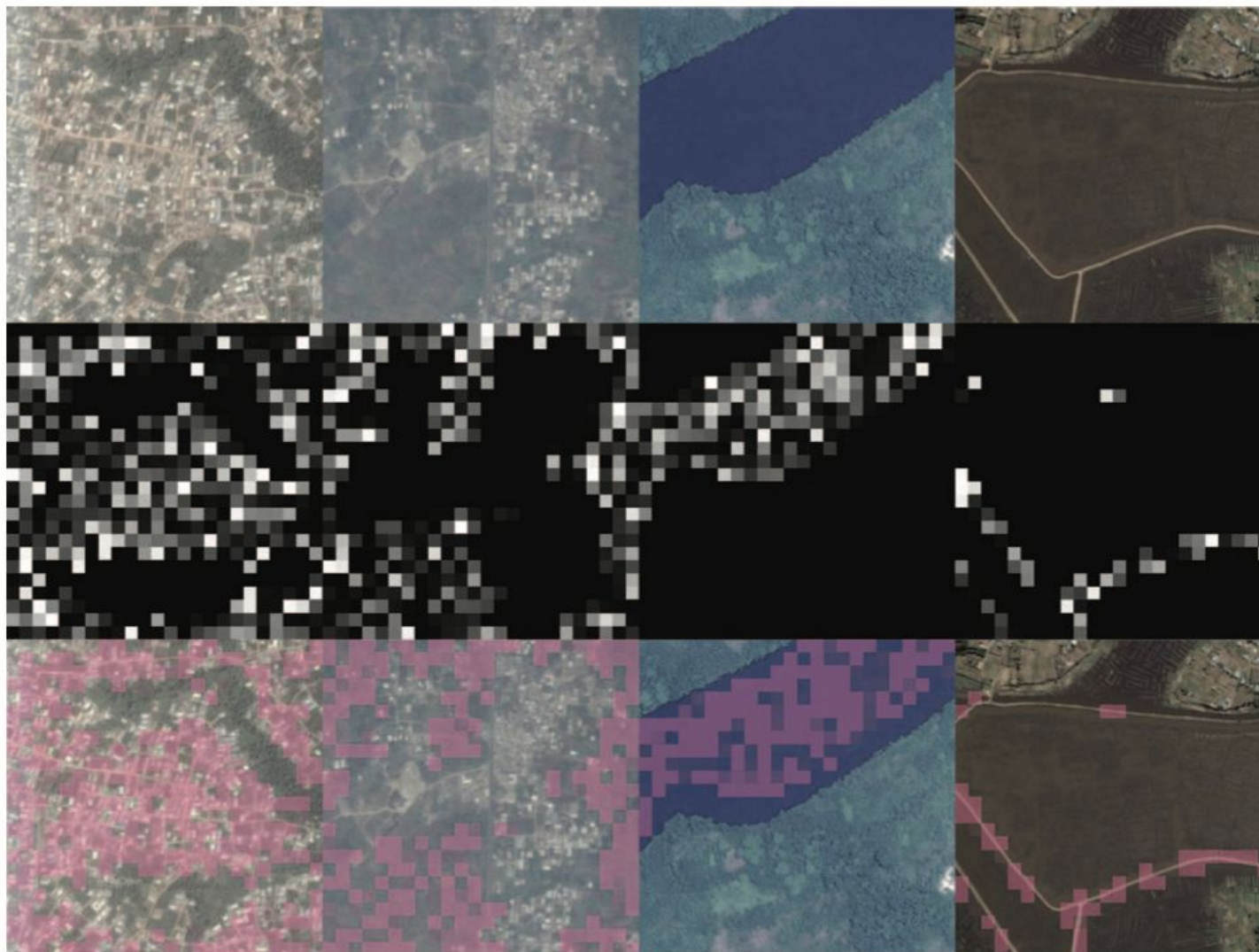
- Weidmann and Schutte (2017): night-time light  regional Gini coefficient
- Jean et al. (2016): daytime satellite image  regional wealth

## Mobile Phone Metadata

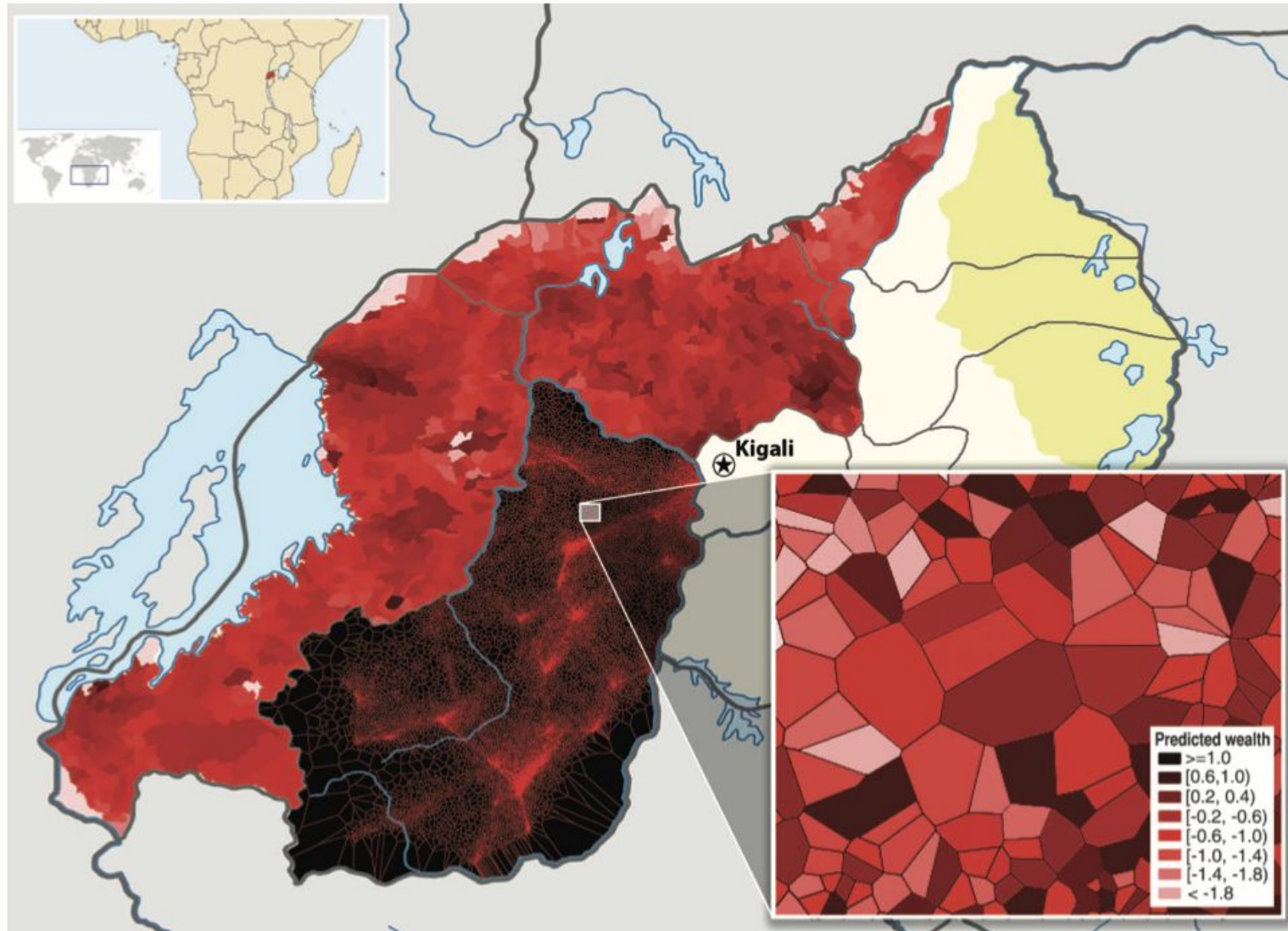
- Blumenstock et al. (2015): phone interaction  subscriber's wealth

## Real-Time Private Data

- Chetty et al. (2020): academic-private partnership; the real-time making of inequality



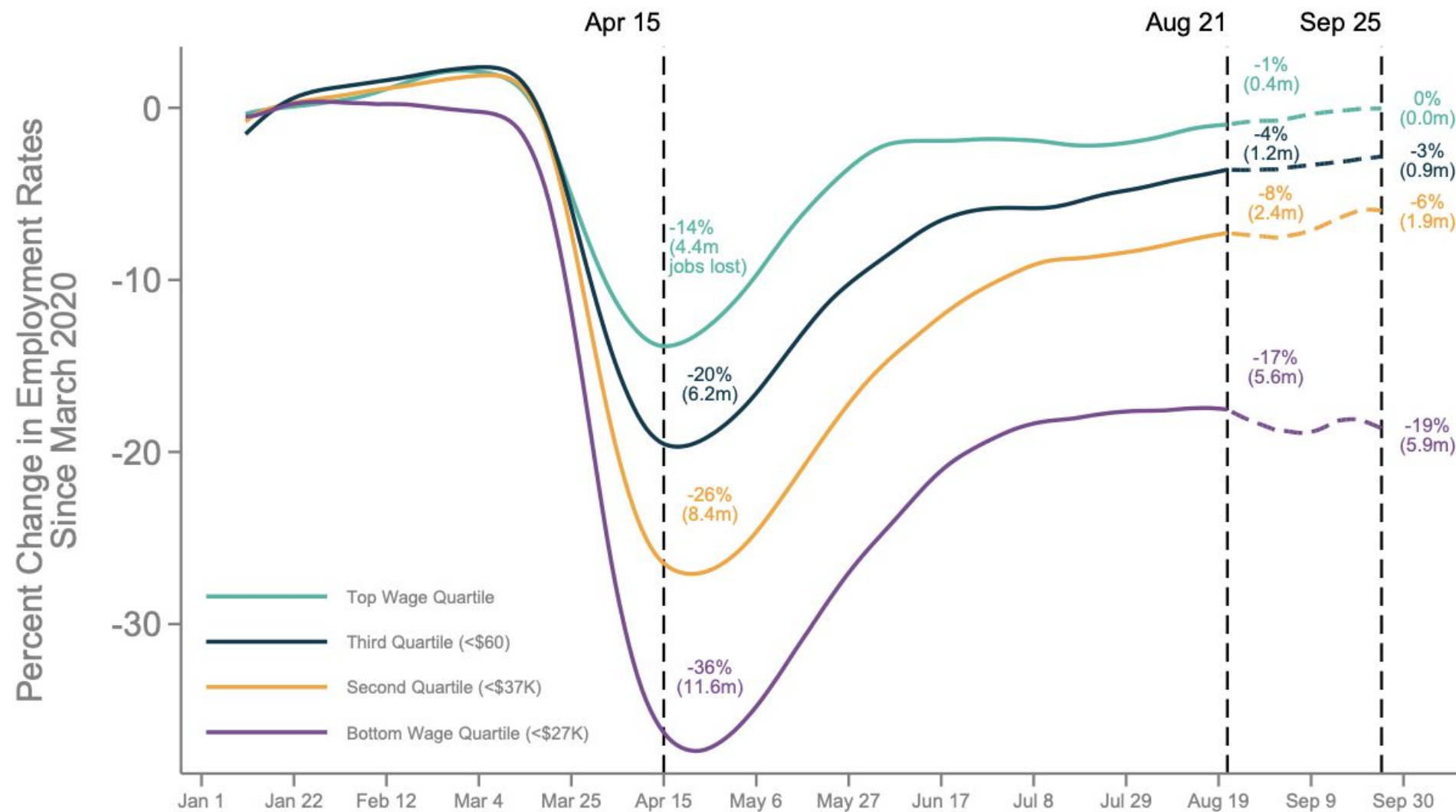
**Fig. 2. Visualization of features.** By column: Four different convolutional filters (which identify, from left to right, features corresponding to urban areas, nonurban areas, water, and roads) in the convolutional neural network model used for extracting features. Each filter “highlights” the parts of the image that activate it, shown in pink. By row: Original daytime satellite images from Google Static Maps, filter activation maps, and overlay of activation maps onto original images



**Fig. 2. Construction of high-resolution maps of poverty and wealth from call records.** Information derived from the call records of 1.5 million subscribers is overlaid on a map of Rwanda. The northern and western provinces are divided into cells (the smallest administrative unit of the country), and the cell is shaded according to the average (predicted) wealth of all mobile subscribers in that cell. The southern province is overlaid with a Voronoi division that uses geographic identifiers in the call data to segment the region into several hundred thousand small partitions. (**Bottom right inset**) Enlargement of a 1-km<sup>2</sup> region near Kiyonza, with Voronoi cells shaded by the predicted wealth of small groups (5 to 15 subscribers) who live in each region.



## A. Changes in Employment by Income Quartile



# Theory with Network Simulation

## The Long History of Network Analysis

- **Montgomery (1991): density of social ties, stratification by ability**
- **Deterministic**

## Network + Agent-Based Modelling (ABM)

- **DiMaggio and Garip (2011): network externality**
- **Zhao and Garip (2019): consolidation**

# Theory with Network Simulation

## Pros and Cons

- Flexible experimentation  new theoretical insights
- No direct bearing to income and wealth inequality

**THANKS**