Lecture 3
Data Visualization

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Data Science for Economics

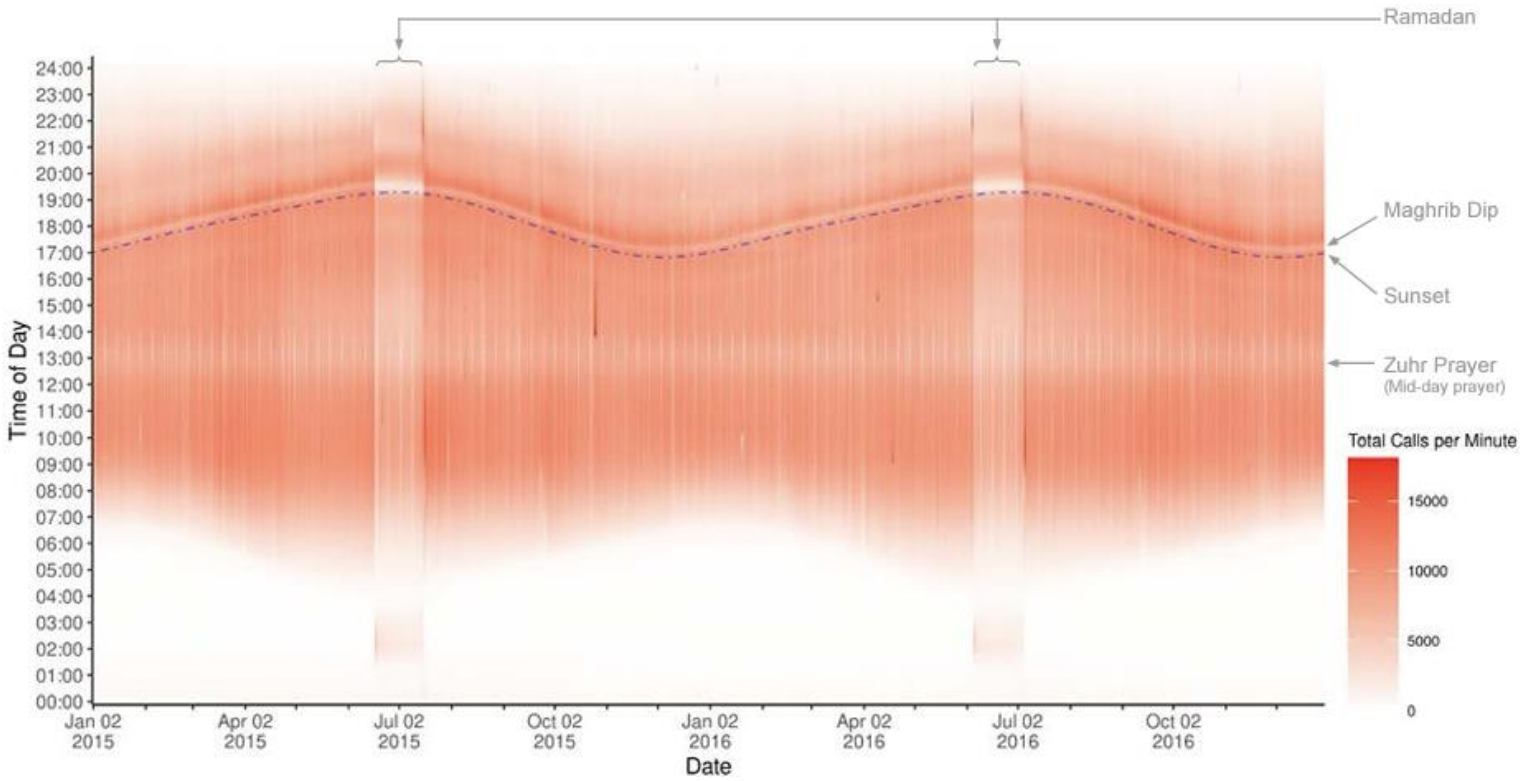
Agenda

1. Value of visualizing data
2. Visualization examples in 2024 dev econ Job Market Papers
3. Intro to data wrangling and visualization in Python

A picture is worth a thousand words

The best research can be summarized in one key exhibit.

Figure 2: Intensity of mobile phone calls over time



Dube et al (2022 WP), Measuring religion from behavior: Climate shocks and religious adherence in Afghanistan

Nice examples of spatial data visualization and development: Jose Luengo-Cabrera

Value of visualizing data

- **Simplifies Complex Data**: Transforms multidimensional datasets into easily interpretable visuals, enabling researchers to identify patterns, trends, and outliers at a glance.
- **Enhances Communication**: Effectively conveys findings to diverse audiences.
- **Facilitates Hypothesis Generation**: Helps uncover unexpected relationships or anomalies in data, prompting new.
- **Supports Robust Analysis**: Enables exploratory data analysis, model validation, and assumption testing to strength formal econometric analysis.

Many different types of visualizations

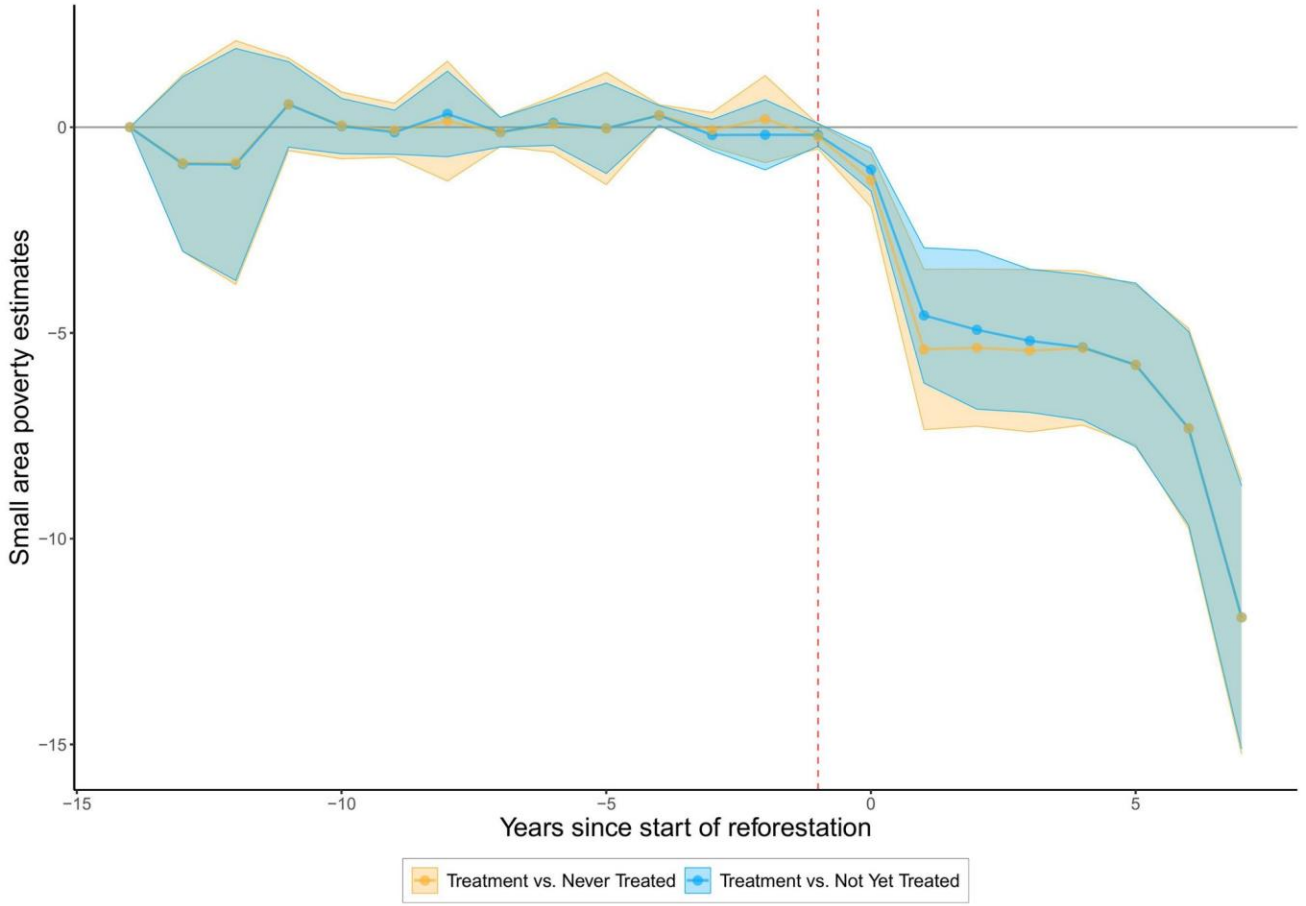
- Frequency visuals: bar charts, histograms, box plots, pie charts, summary tables
- Correlation visuals: scatter plots, regression tables
- Trend visuals: line graphs
- Maps: heatmaps, chloropleth maps
- Network diagrams
- Logical/hierarchical visuals: tree maps, flow charts
- And more…

Source

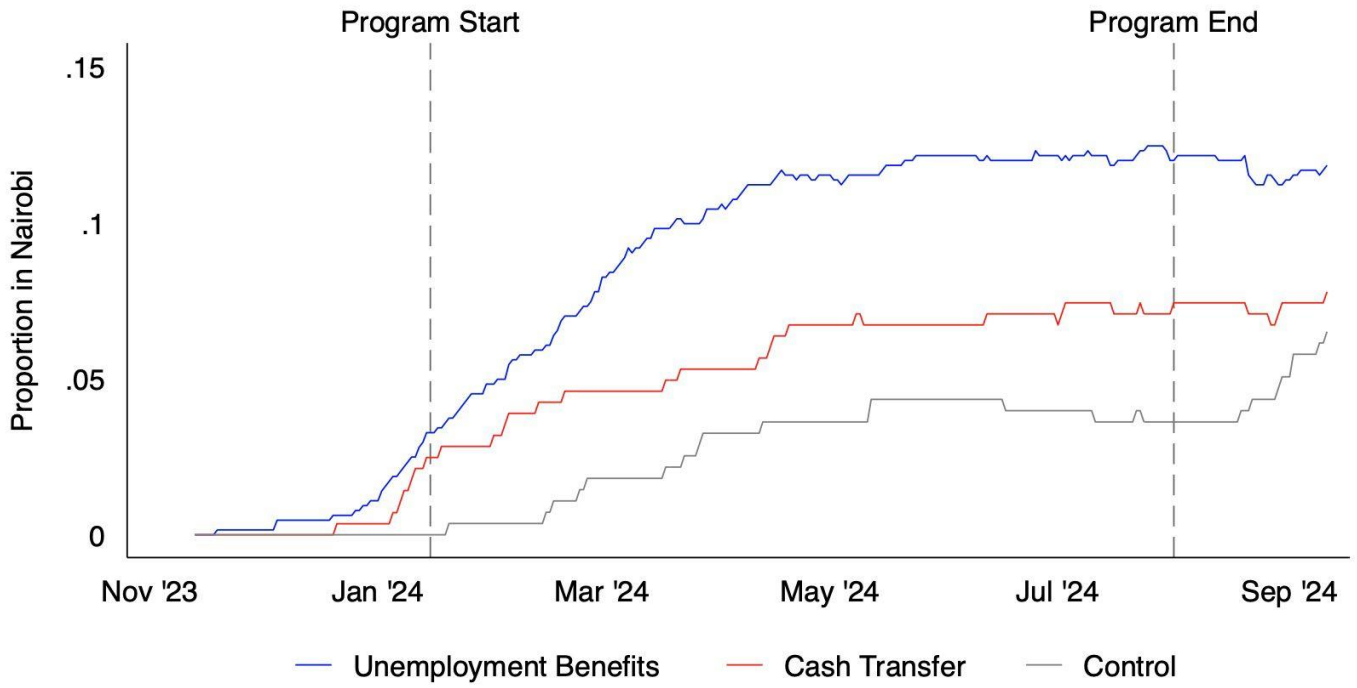
Visuals in papers of current econ dev job market candidates

- Nice examples of what current PhD candidates are working on
- Wide variety of methods and visuals
- Applications to economic development research
- Main source: 2024 WB JMP Blogs

Pagel: Tree planting (National Greening Program) and poverty in the Philippines

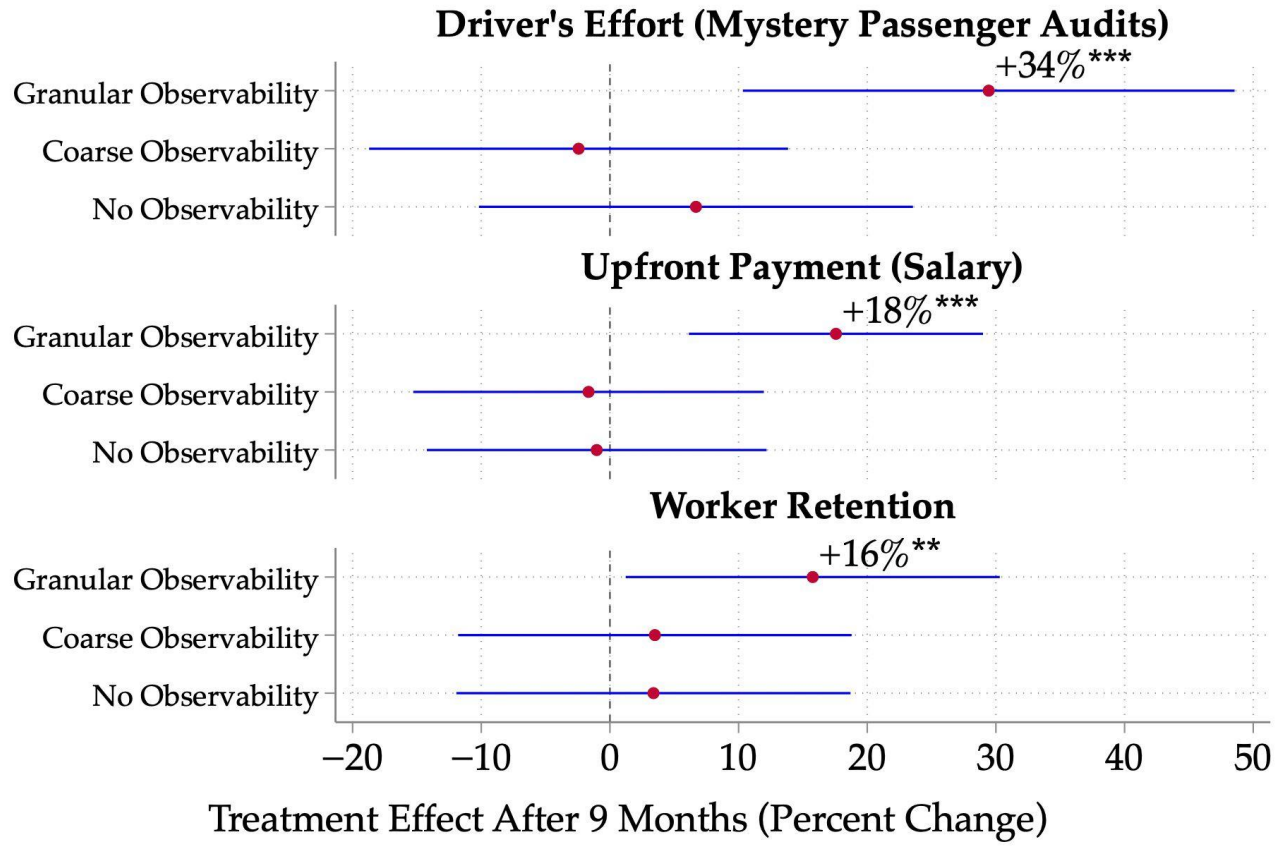


Miner: Reducing internal migration uncertainty RCT in Kenya



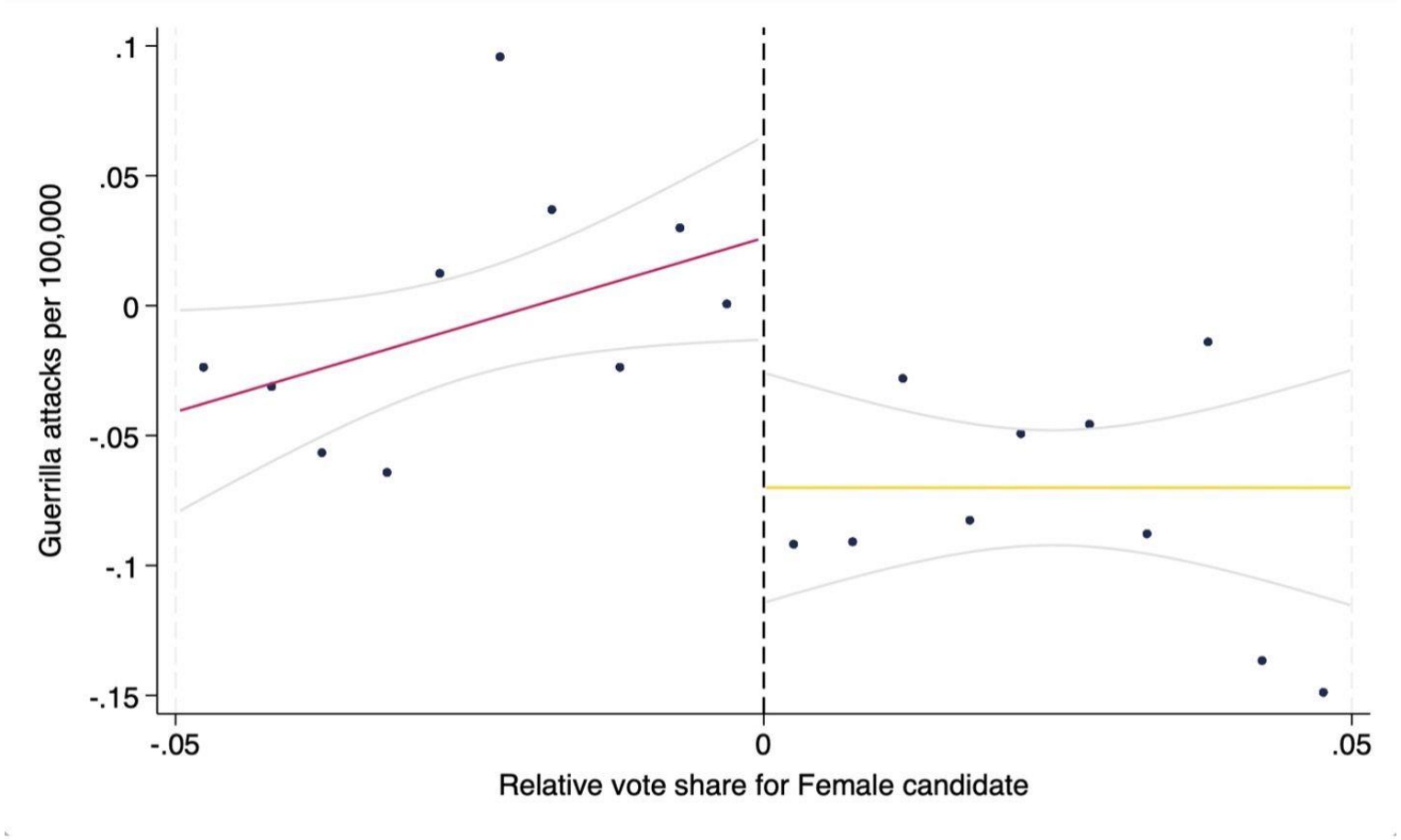
Unemployment benefits conditional on moving to Nairobi
Cash transfer unconditional

Houeix: Digital technology, information frictions, and firm efficiency among taxis in Senegal



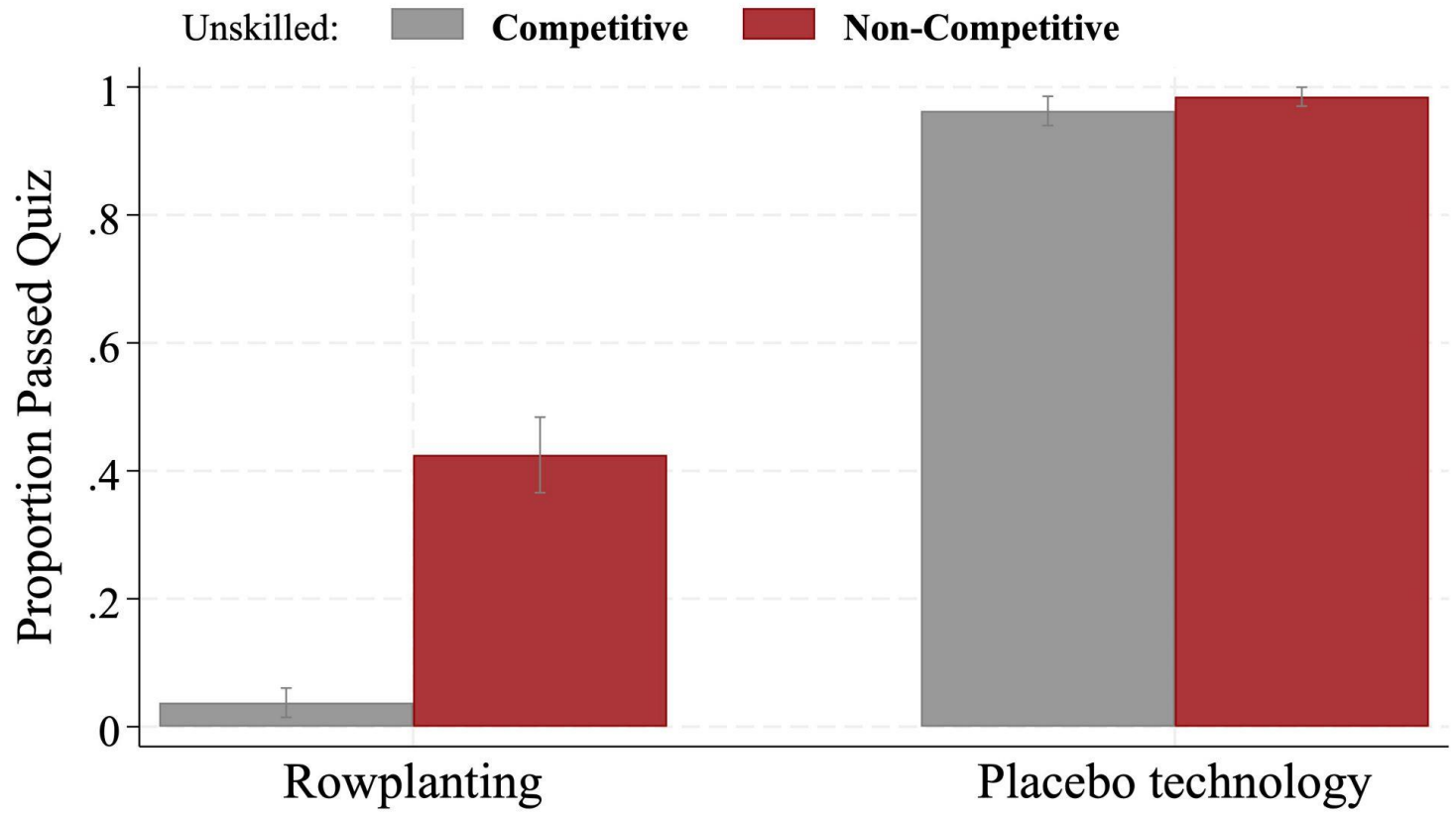
Granular: owner can observe driver's effort and output
Coarse: owner gets noisy measure of output

Eslava: Female leaders and armed conflict in Colombia



Municipality-level data

Cefala: Knowledge hoarding as a barrier to agricultural innovation in Burundi



Competitive = trainer and trainee in same village

Cisse: Value of electricity reliability in Senegal

Figure A3: MAP OF FEEDER LINES BY TIMING OF RELIABILITY PROJECT IN SENEGAL

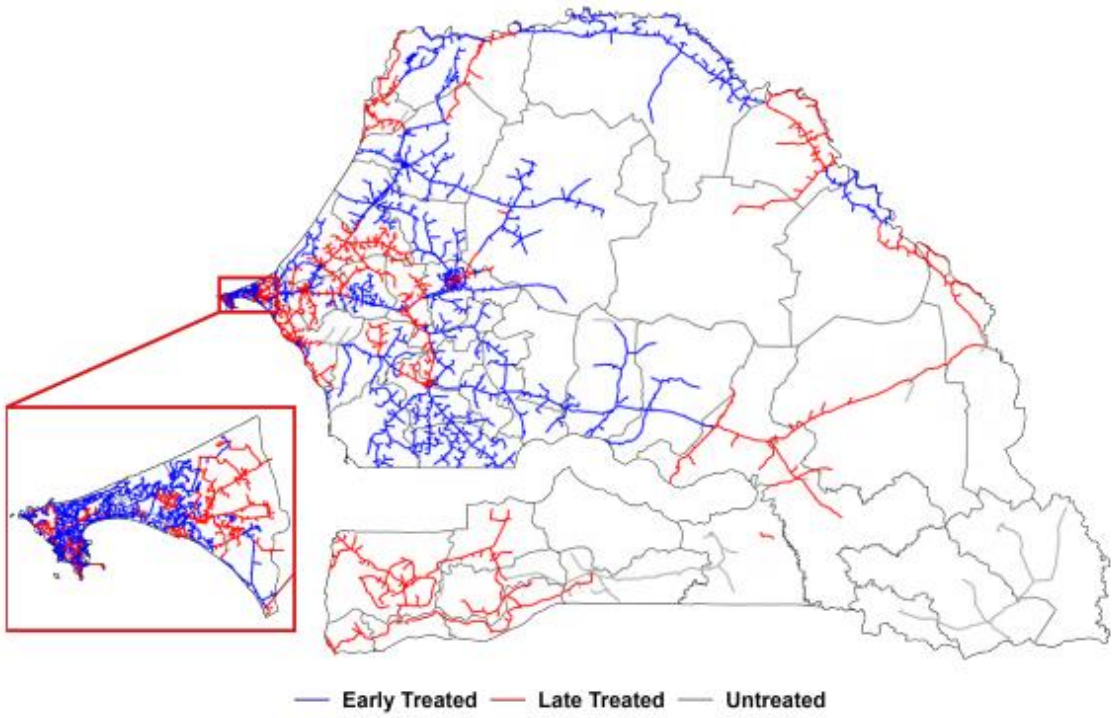
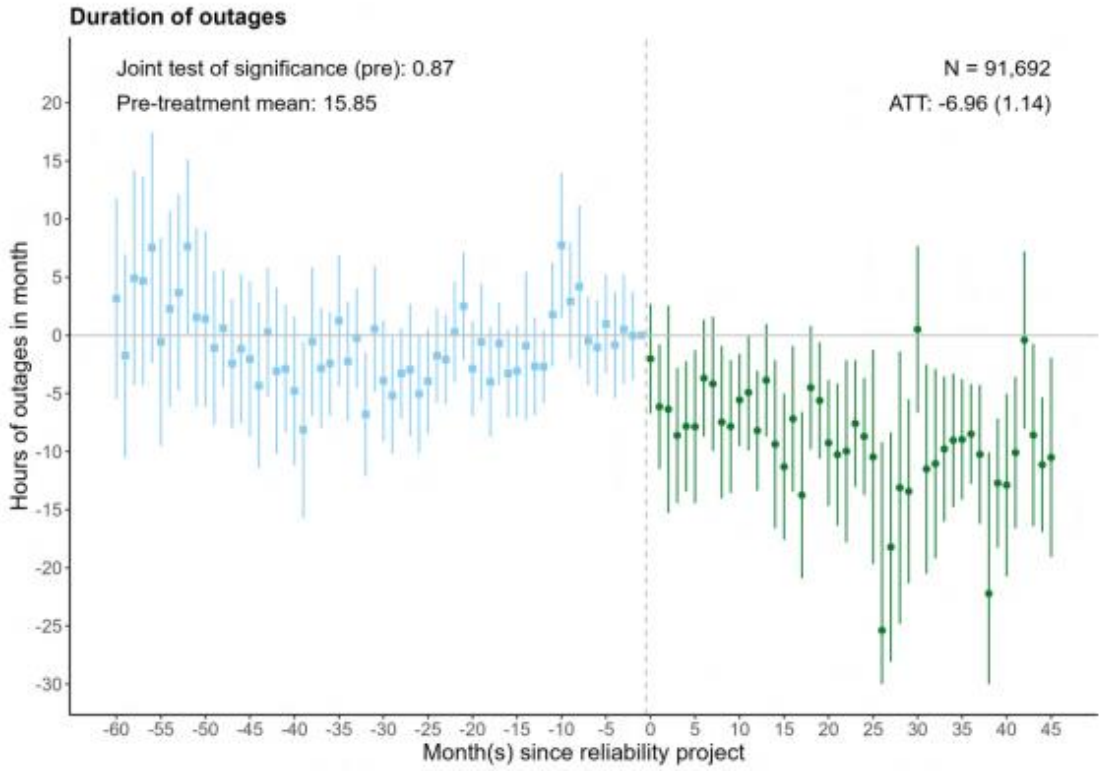
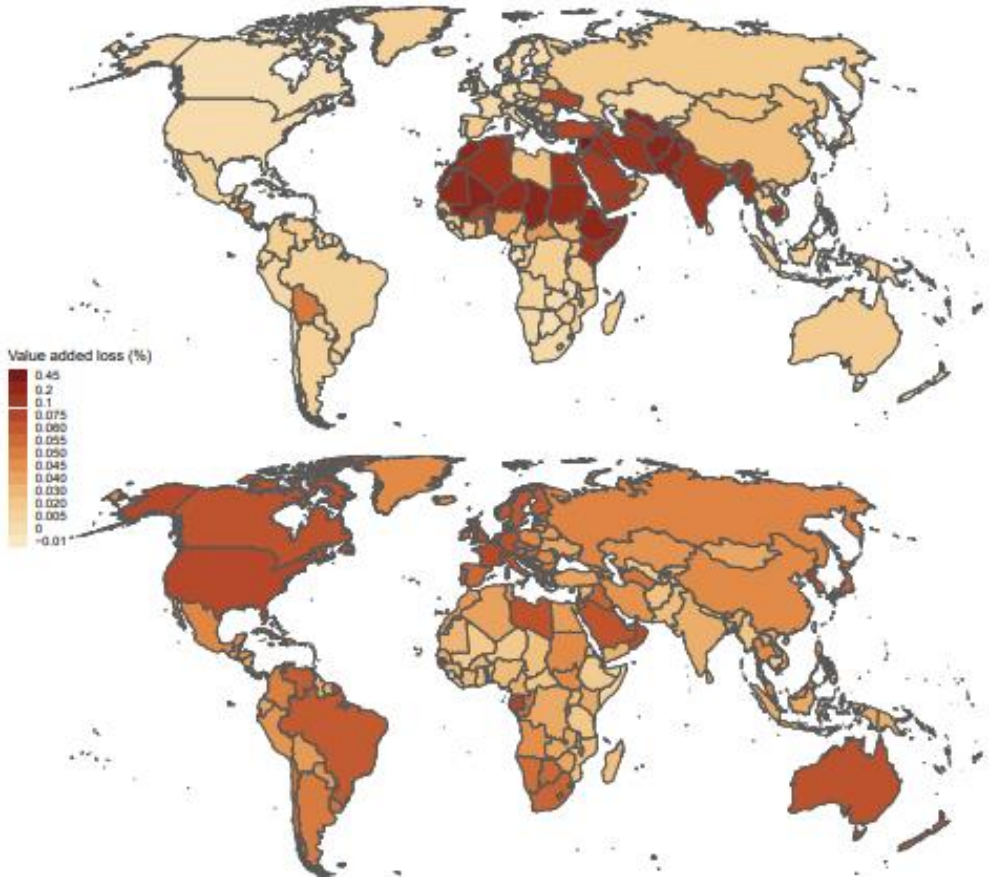


Figure 3: IMPACT OF RELIABILITY PROJECTS ON THE MONTHLY DURATION OF OUTAGES



Zappala: Impacts of extreme heat in agricultural across sectors and space

Figure 8. Annual value added losses (%) induced by recent warming (2001-2020)
(a) Global distribution of value added losses in agriculture (above) and in downstream sectors (below)



Value of visualization along the research process

- Data cleaning and preparation:
  - Summary statistics and frequency distribution
  - Checking for outliers
  - Identifying potential data errors
  - Thinking about data generating process
- Testing assumptions: plotting correlations, simple regressions
- Econometric analysis: synthesizing and clearly communicating results

Think about your audience

- You don’t write an academic paper the same way as a policy brief
- Your visualizations should be at the level of the audience

Into Jupyter!