

A Multi-Factored Mechanism to Distribute Health Emergency Funds

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Oct 24, 2023

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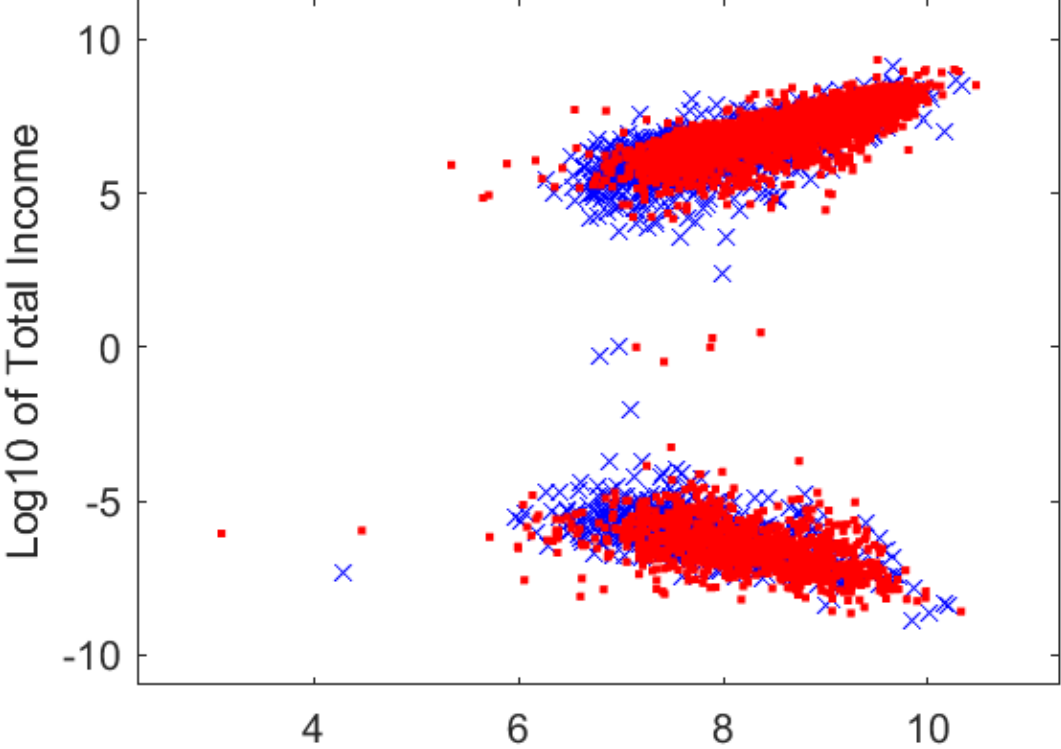
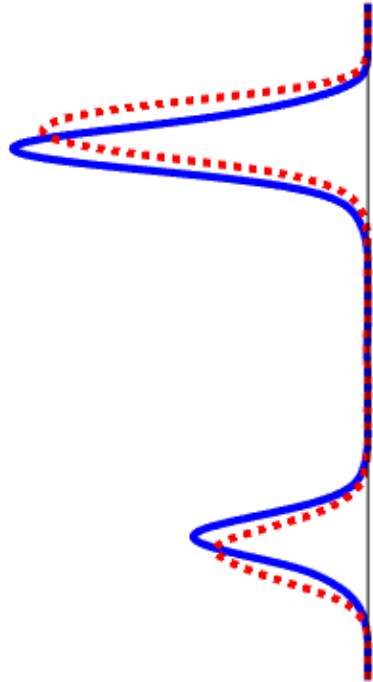
Background

- The Coronavirus Aid, Relief, and Economic Security (CARES) Act was passed by Congress on March 25, 2020 and signed into law on March 27, 2020.
- Under the law, the Provider Relief Fund was created.
- The early rounds of the Fund were distributed mainly based on revenues of the hospitals, not community characteristics
- The news media (Wall Street Journal) criticized that profitability of hospital was not considered.
(<https://www.wsj.com/articles/billions-in-covid-aid-went-to-hospitals-that-didnt-need-it-11670164570>)
- In April 2023, the House Committee on Oversight and Accountability launched an investigation into how the funds were allocated to hospitals.

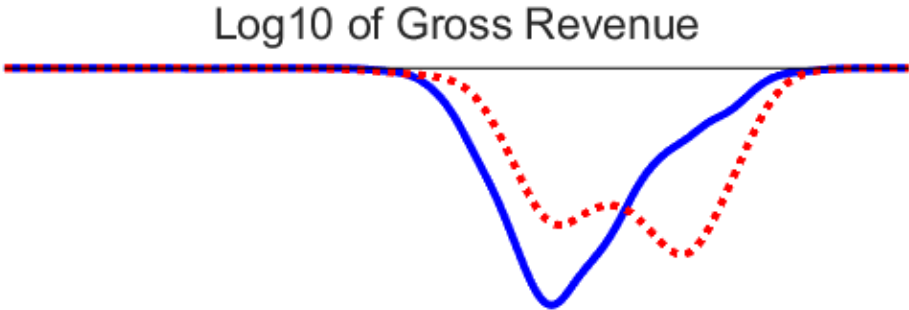
Introduction

- Research Question: How to distribute federal financial support to hospitals quickly at the beginning of an emergency?
- Should the mechanism consider community characteristics in addition to hospital revenue?
- We conduct analysis on characteristics of health providers and communities they serve to suggest the need for a multi-factor modeling approach to distribute future emergency funding
- We use data from Centers for Medicaid/Medicare Services (CMS), Census American Community Survey (ACS) to create hospital groupings

Total Income vs Gross Revenue



× Rural
▪ Urban



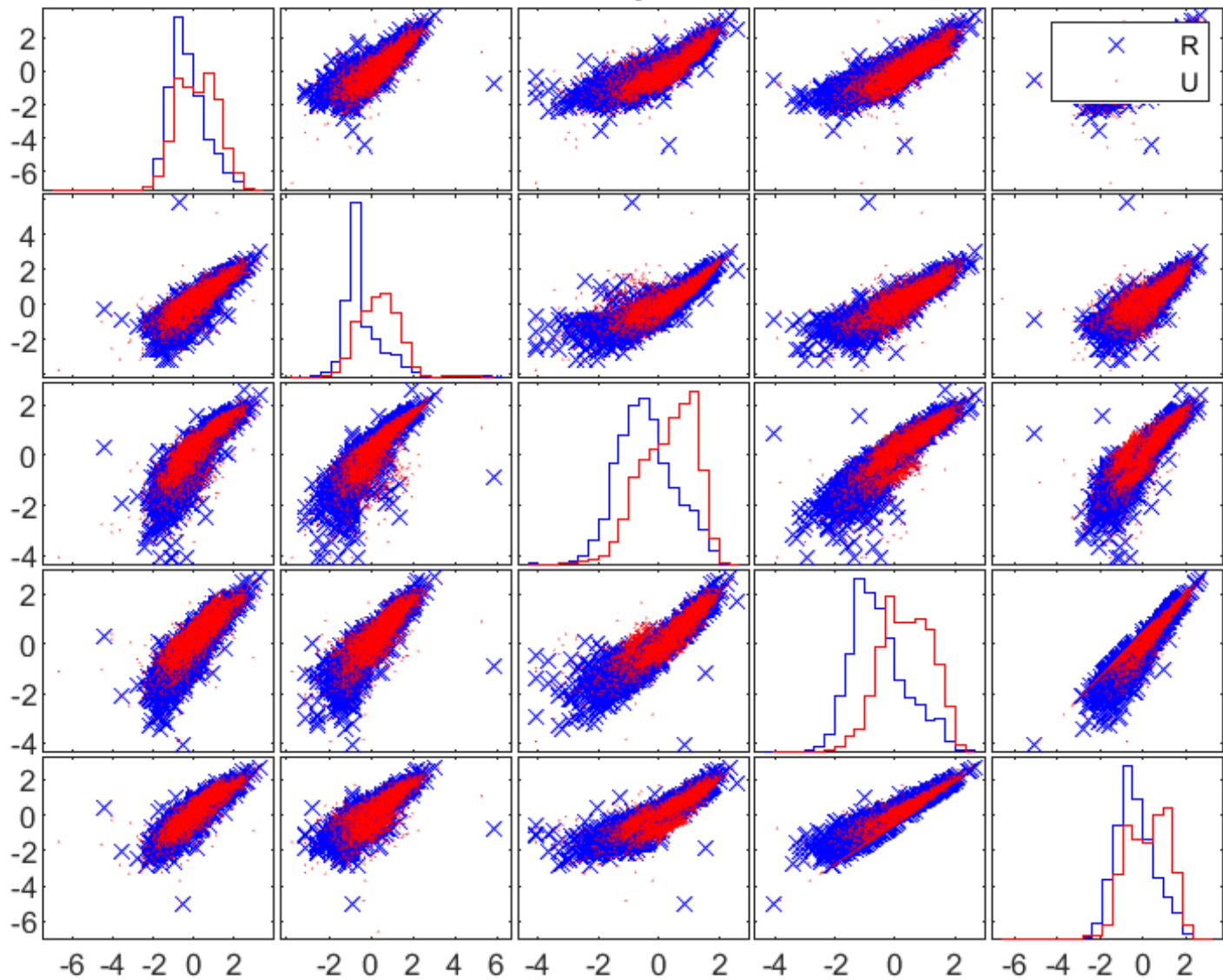
What to Consider

- Hospital Characteristics
 - Type
 - Size
 - Finance
 - Patients
- Community-level Characteristics
 - Demographics
 - Socioeconomics
 - Medical Insurance

Hospital Characteristics

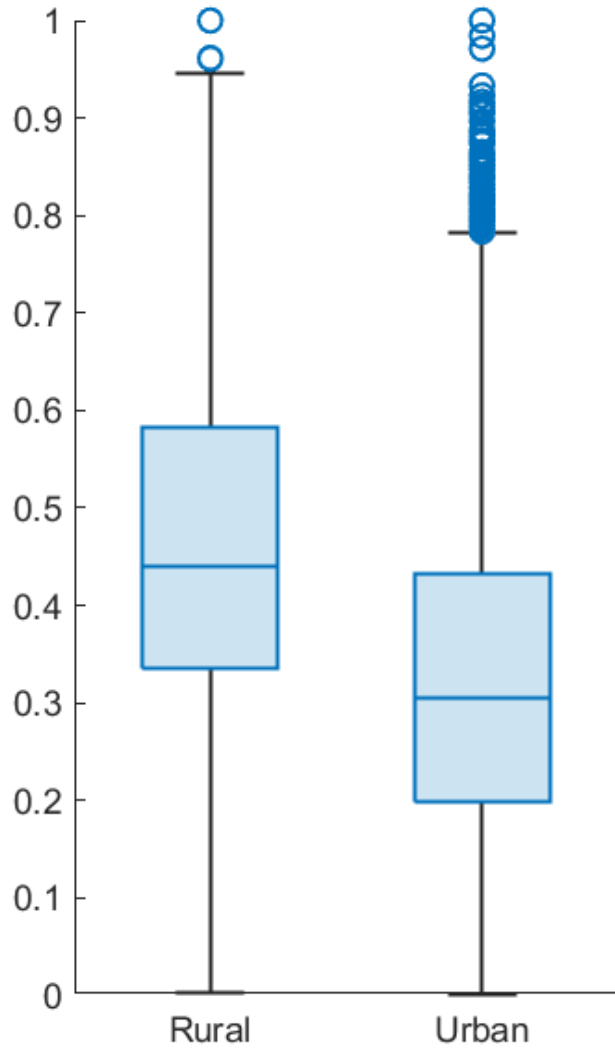
- Revenue
- Income
- Number of Employees, Beds
- Hospital Type
- Rural/Urban
- Discharges/Days
- Inpatient/Outpatient
- Medicare/Medicaid
- More

Rural vs Urban--Hospital Characteristics

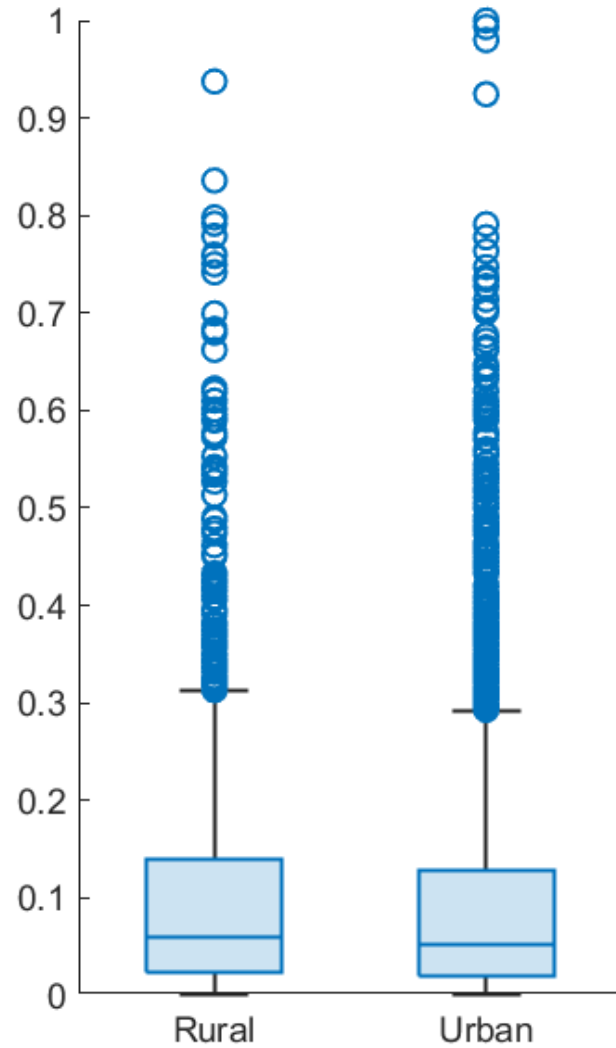


Employees, Beds, Discharges, Charges, Inpatient and Revenues: Logarithm Normalized

Proportion of Medicare Discharges



Proportion of Medicaid Discharges



American Community Survey Data on People

- Demographics

- Age

- Race

- Sex

- Socioeconomics

- Median Income

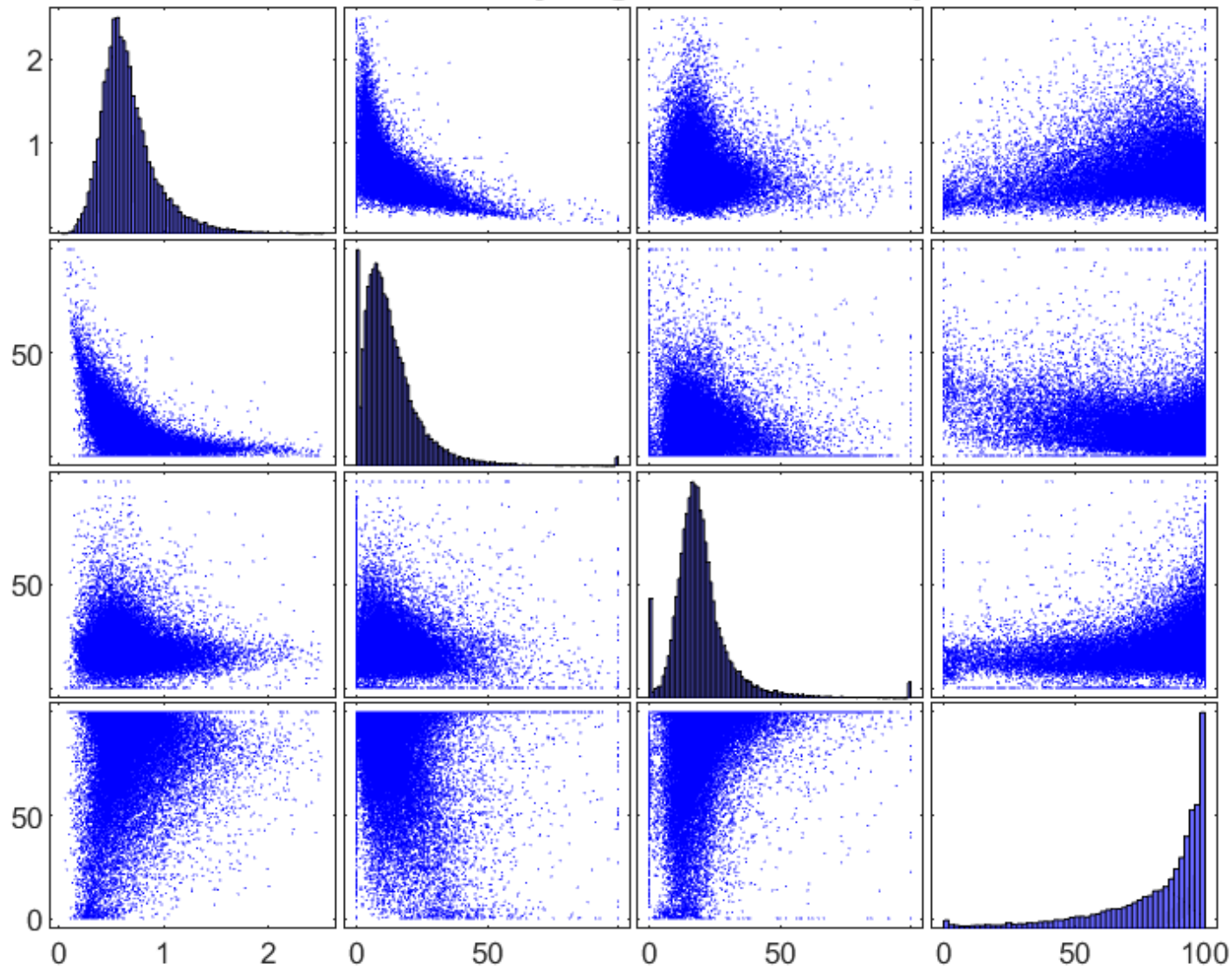
- Poverty Rate

- Medical Insurance Coverage

- Not Insured

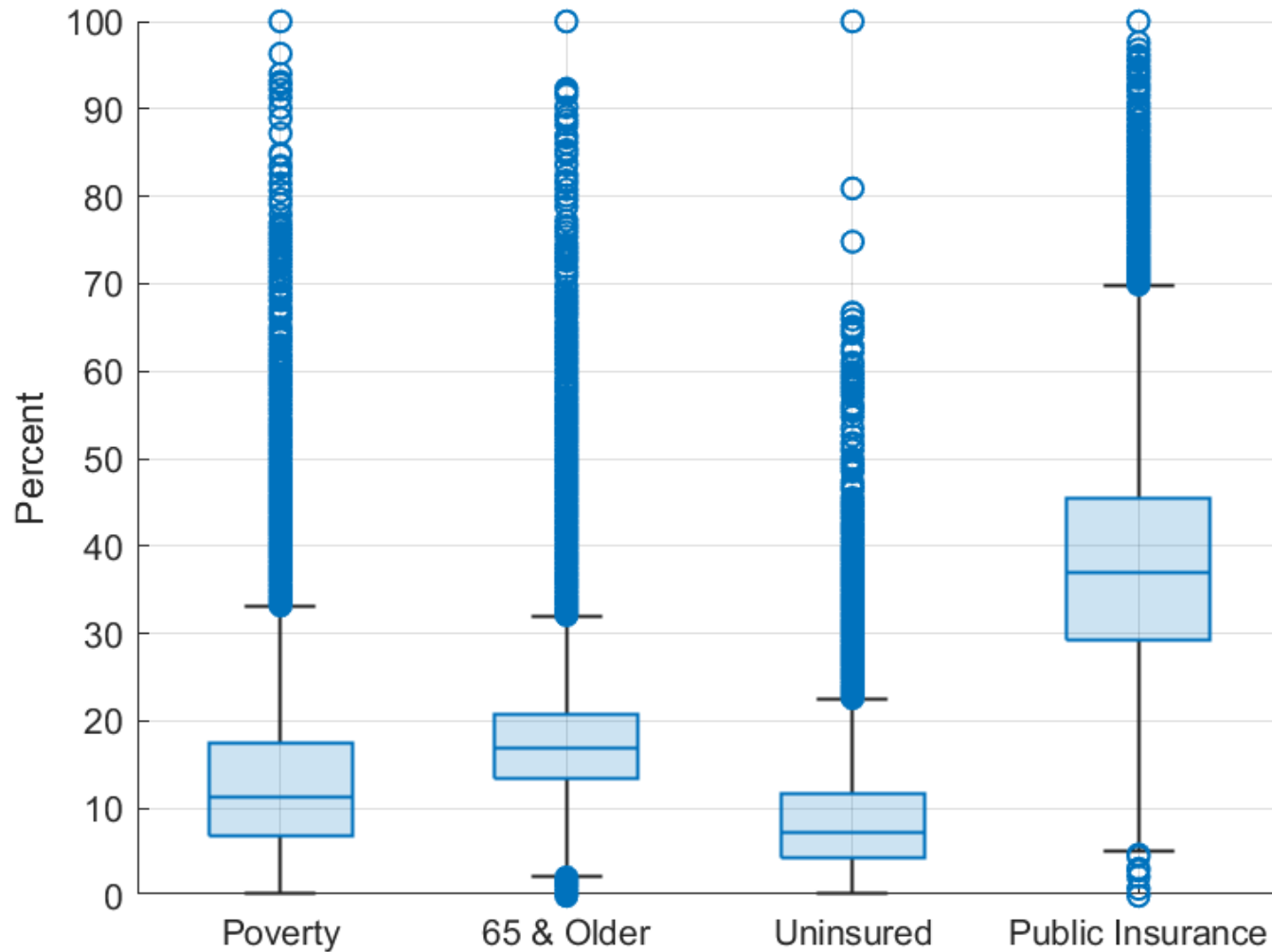
- Medicare/Medicaid

Median Income, Poverty, Age, and Race: Zip Code Level



$\times 10^5$
Household Median Income, Poverty Level, 65 & Older, White

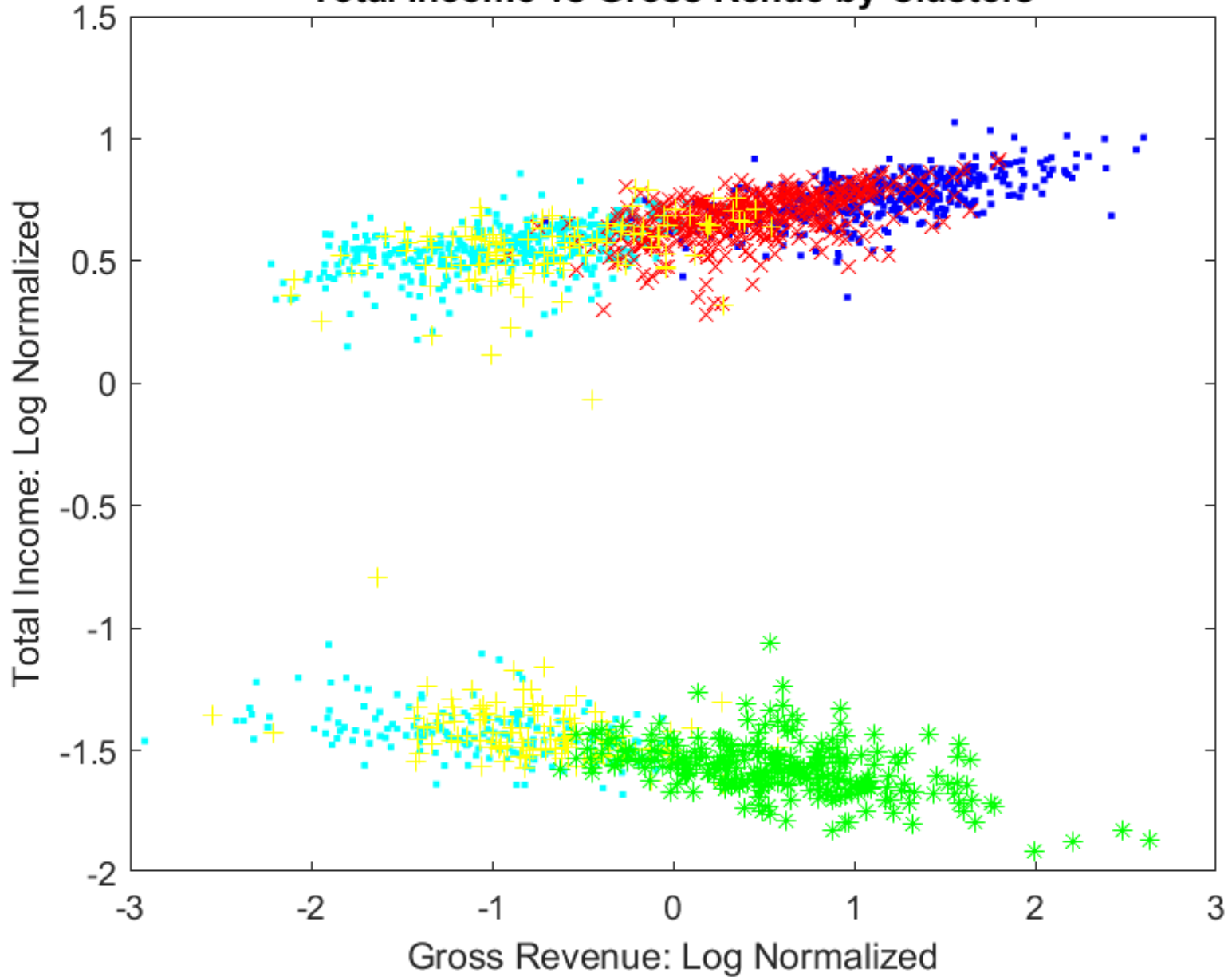
Proportions of Uninsured and Using Public Insurance



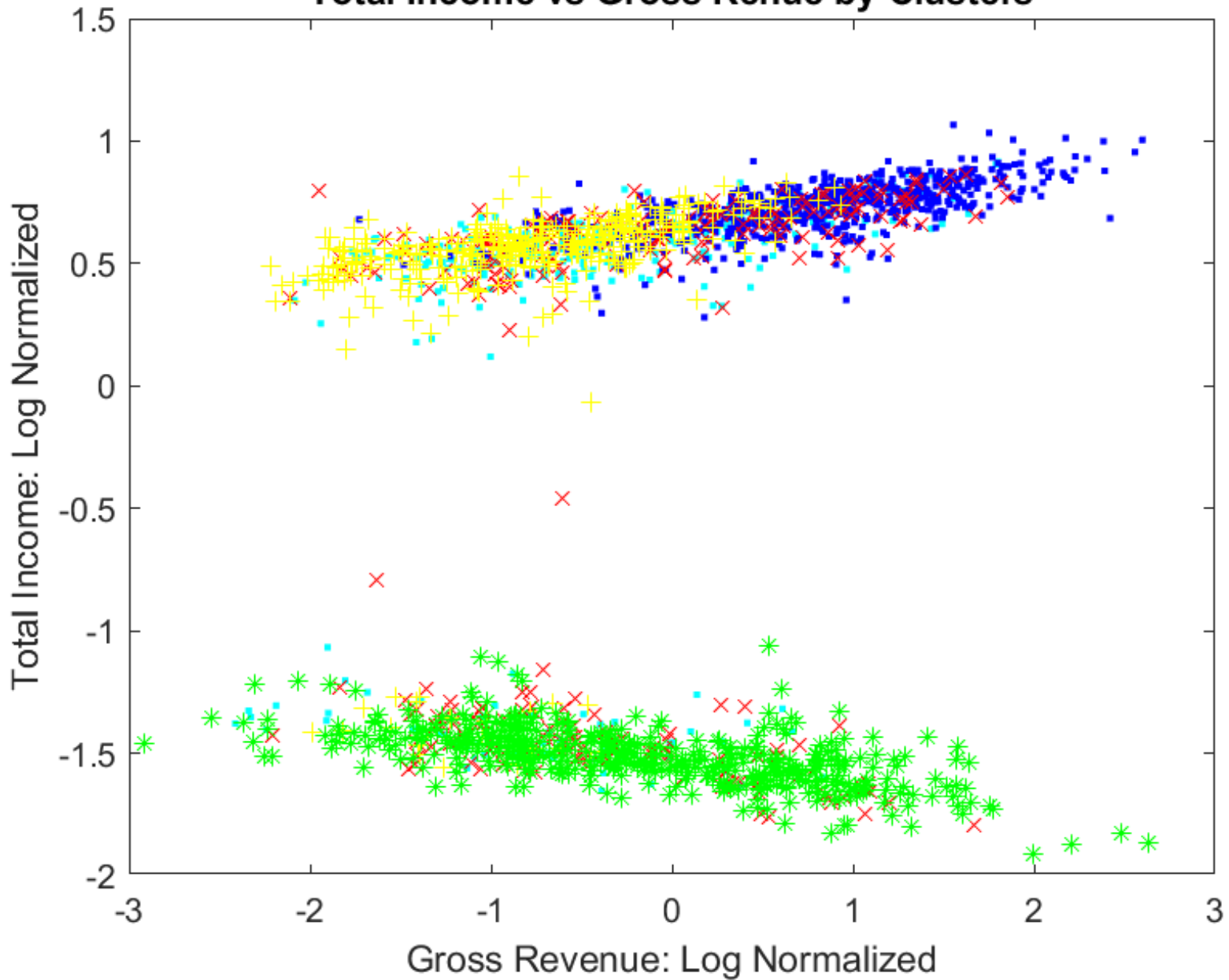
Cluster Analysis

- Aggregation of Census Data by Hospital Service Areas
- Merging Hospital and Census Data by Hospital
- Missing Data
- Principal Component Analysis (PCA)
- Variables Construction
- Clustering Models

Total Income vs Gross Revenue by Clusters



Total Income vs Gross Revenue by Clusters



What's Next?

- Analyze the clusters and the relationships among important variables.
- Get Subject-Matter Expertise from Policy Research and Medical Industry.
- Compare redesigned payment mechanism to provider fund mechanism.
- Use findings to suggest a redesigned payment mechanism that considers both community level and hospital factors.

Other Factors to Consider in Future

- Pandemic Characteristics
 - Weather
 - Vulnerable Population
- Geographic Data
 - Climate/Weather
 - Terrain
 - Population Density