Rural Electrification:

Lessons learned from a New Deal Era Program

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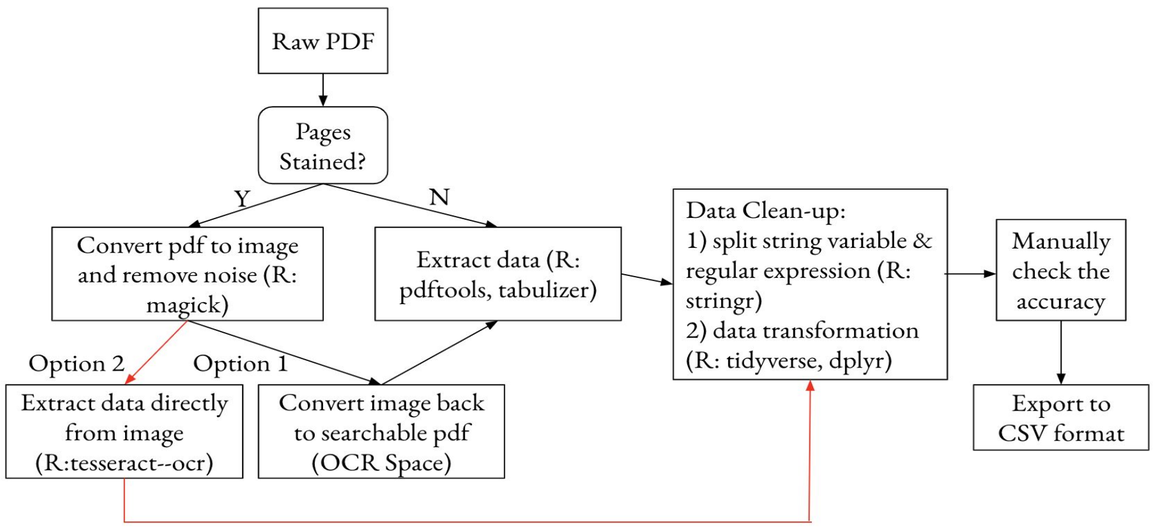
Background: The Great Depression and Rural Electrification

- Early 1930s - U.S. is in the Great Depression; only 10% of rural farms electrified (1935)
  - Federal government establishes Rural Electrification Administration (REA)
    - Provided low-interest loans for farmers to set up local electric cooperatives.
    - Ran the Electric Farm Equipment Roadshow from 1939 to 1941.

Did the Electric Farm Equipment Roadshow lead to local increases in rural electricity consumption?

Data Collection

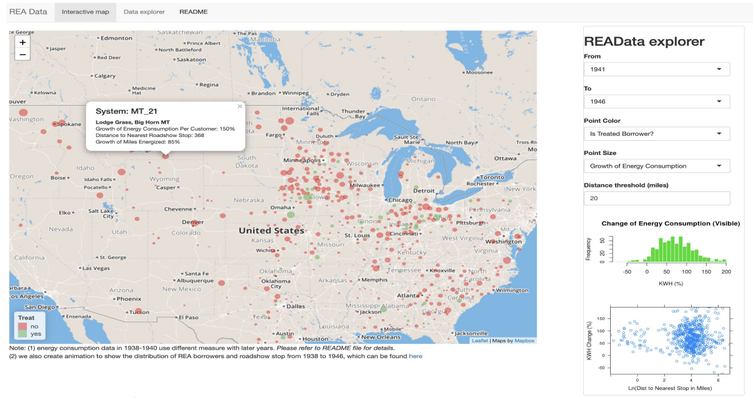


Using the workflow outlined above, we converted raw pdfs of the following reports to clean csv files.

- State-level Production of Electric Energy and Capacity (1940-1954)
- Directory of Electric and Gas Utilities (1940-1948)
- REA Annual Statistical Report (1941-1946)
- County-level US census data

Methods

- **Assignment of roadshow stop locations is not random**
  - Employed statistical "causal inference" methods to adjust for confounding in effect estimate
- Used **covariate** and **propensity score** matching techniques



Note: (1) energy consumption data in 1938-1940 use different measure with later years. *Please refer to README file for details.*
(2) we also create animation to show the distribution of REA borrowers and roadshow stop from 1938 to 1946, which can be found here

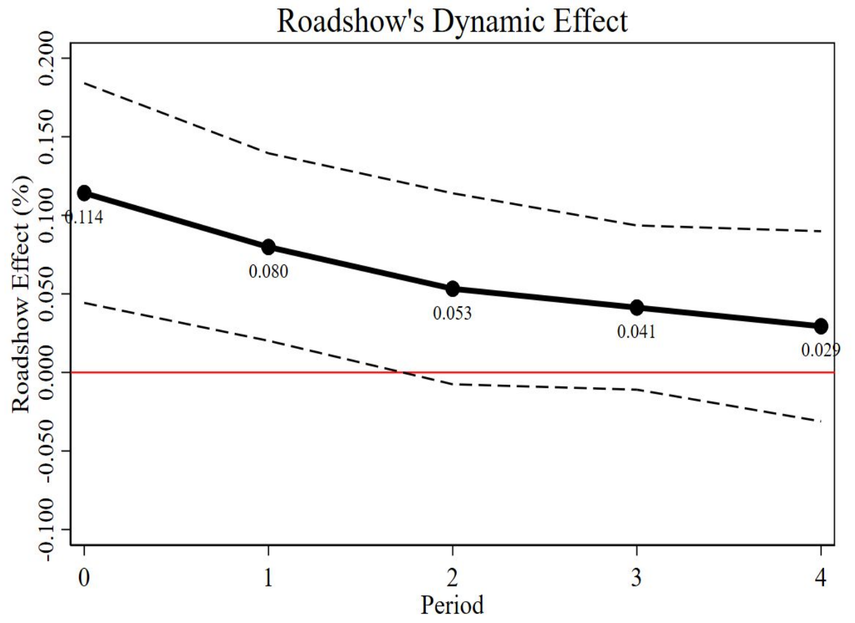
Additional deliverables from the program include an interactive ShinyApp, pictured to the left, as well as a public GitHub repository of our data and analyses.

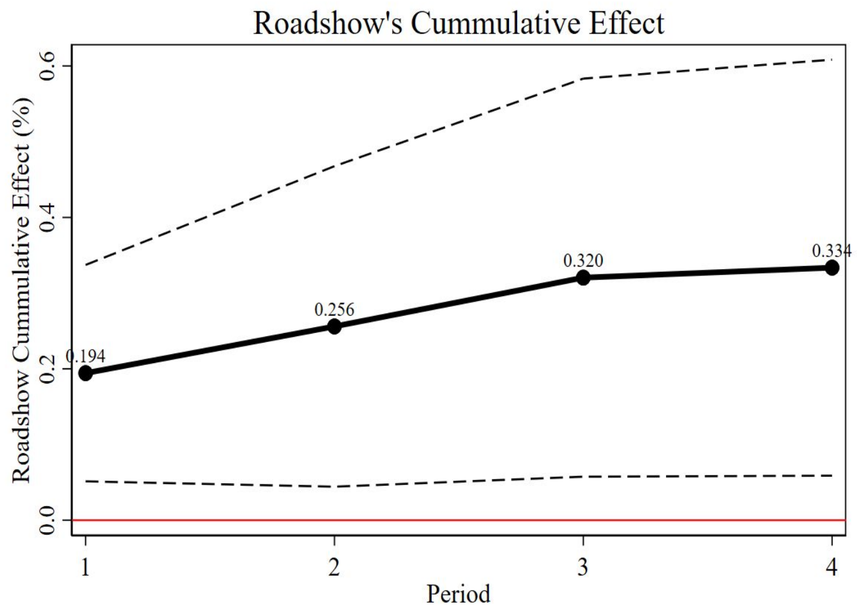
Results

Yes, our covariate matched analysis indicated a yearly **64** (±54) **kWh** increase per residential customer, while our propensity score analysis indicated a **90** (±70) **kWh** increase.

Borrower-Year Level Propensity Score Matching

Since treated time is different for each REA borrower, we can also match sample based on the year they start being treated to reveal the trajectory of roadshow effect in all subsequent years.





Next Steps

- Refine analysis and produce technical write-up for journal publication.
- Extend findings to explore present day applications of similar rural electrification strategies.

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