How Rural Matters for Election Administration

Depends on Which Outcome You're Measuring

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Rural-urban EA gaps are mostly cross-state and measure-dependent: rurality is more than a single county score.

Motivation

Election-administration researchers who condition on rurality reach for whichever scheme is convenient (e.g., RUCC, RUCA, NCHS, OMB metro/nonmetro, or a continuous index like IRR). These schemes were built for the USDA, rural health, and federal reporting. None were designed for studying election administration, and they often disagree. Across U.S. counties, classifications disagree on 12.6% of cases. Applied work should test whether that choice changes the inference. The contested jurisdictions aren't fringe cases. They're the populous middle of the distribution, where wealthy exurbs sit alongside struggling small cities.

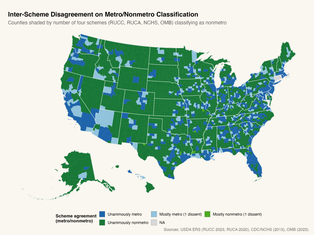

Fig. 1. U.S. counties shaded by the number of schemes (RUCC, RUCA, NCHS, OMB) calling them nonmetro. Contested cases concentrate in the South and along exurban metro fringes.

Research Question

When does the choice of rurality measure actually matter for what we conclude about how rural counties run elections, and when does it not?

Data

EAVS 2024: county-level (sub-county-jurisdiction states excluded: CT, MA, ME, NH, RI, VT, VA). Eight EA outcomes spanning registration, ballot processing, and poll-worker capacity.

Voter confidence: SPAE 2016-2024 pooled, 46,000 respondents across 2,562 counties, weighted county means.

Rurality measures: RUCC (USDA, 9-cat), NCHS (6-cat), Index of Relative Rurality (IRR; Waldorf-Kim 2020, continuous on [0, 1]).

Sample sizes per outcome: 1,183 (UOCAVA) to 2,562 (confidence).

Methods

For each outcome, I estimate the IRR rural gradient (controlling for log population) under progressively stricter inference:

- Cluster by state: counties within a state aren't independent
- + spatial dependence: Conley distance-based SEs
- Within one state (Texas): policy held constant
- Across measures: IRR, RUCC, RUCA, NCHS, `rurality` (Fig. 3)

An effect is robust only if it survives the full ladder, the measure included. (Demographic controls examined separately; some effects seem to run through economic composition.)

SAME STATE, DIVERGING SCORES

Two contested Arkansas counties:

Hot Spring Co. pop. 33k	**Perry Co.** pop. 10k
`RUCC 6 (rural)`	`RUCC 2 (metro)`
`NCHS 5 (rural)`	`NCHS 3 (metro)`
`OMB micro`	`OMB metro`
`RUCA 3 (METRO)`	`RUCA 7 (RURAL)`

Disagreement runs in opposite directions. Of 394 contested counties nationally, 373 (95%) are RUCA versus the rest: commuting flows vs. population logic, in the heterogeneous middle of the distribution where the schemes were likely never designed to discriminate.

THE MODEL

$$Y_j = \alpha + \beta M_j + \gamma \log \mathrm{Pop}_j + \varepsilon_j$$

β = rural gradient (per SD of M_j, the rurality measure) • γ = log-population control • α = intercept (state FE in stricter rungs) • ε = error, SEs clustered by state. The robustness analysis re-estimates the same β under increasingly demanding standards to see where it persists.

The Ladder of Rigor

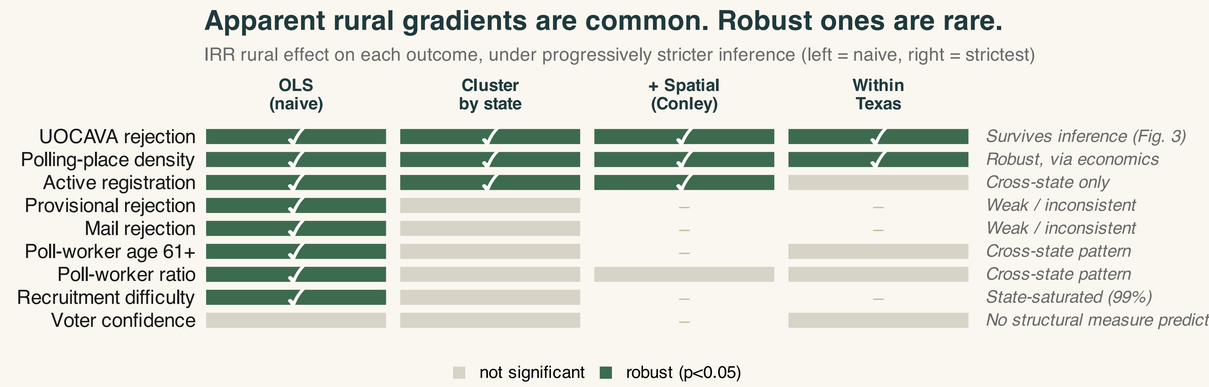

Fig. 2. Each outcome's IRR rural effect as the inference standard tightens (left → right). Green = significant ($p < 0.05$); grey = n.s.; dash = not run. Most gaps are cross-state: they vanish once SEs cluster by state. Only two outcomes remain significant after every inference test. I then stress-test the somewhat federally standardized outcome (UOCAVA) across measures (Fig. 3).

...but which measure? The answer flips.

Why UOCAVA? It's the one (partially, at least) *federally standardized* outcome (MOVE Act): state policy explains just 31% of its variance, vs. 82–99% for state-discretion outcomes like poll workers. So if any county-level rural signal is clean, it's here. It still flips:

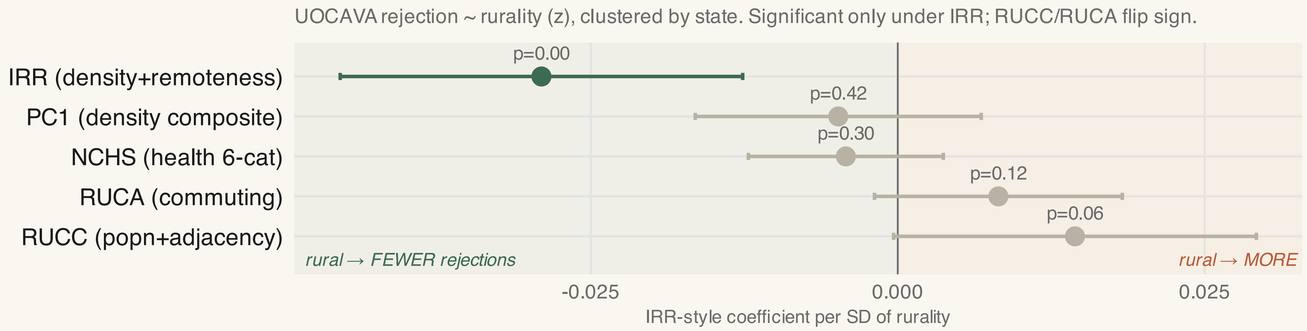

Fig. 3. UOCAVA (the federally standardized outcome that survives every inference test), estimated under five rurality measures, clustered. Negative and significant under IRR; null under an IRR alternative and NCHS; positive under RUCC and RUCA. The measures disagree on the direction of the effect. There is no single "rurality": the choice of measure is part of the research design, not a convenience, and the wrong one can miss real variation.

It lives at the state level

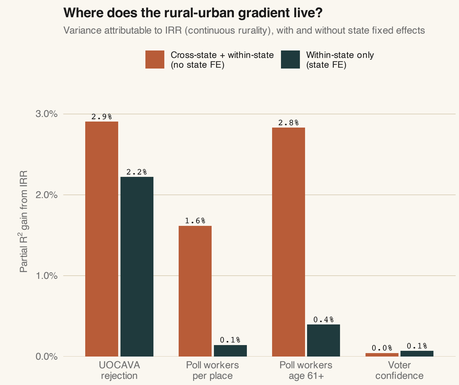

Fig. 4. Adding state fixed effects reduces the IRR R^2 gain to near-zero for every outcome. The rural signal lives between states. I am assuming for now that this is because states set most of the rules governing election administration, so the county or town matters less than the state. Cross-state variation is also entangled with everything else that differs across states.

...but the measures agree at the tail. Searcy County, AR is rural under every scheme: RUCC 9, NCHS 6, IRR 0.84. The schemes only diverge in the seemingly contested middle (Hot Spring and Perry, left) and less in the tails.

IMPLICATIONS

Rurality matters, but it works through specific dimensions and state-level context instead of a single county score. So: report your estimate across several measures (stable = signal; a sign-flip = the effect is dimension-specific). Match the measure to your mechanism. And cluster by state.

NEXT STEPS

- Paper: the full nine-outcome analysis with clustered, spatial, and within-state robustness (forthcoming).
- Identity battery (Phase 3): a validated survey instrument for rural identity and place consciousness. I am looking at this for outcomes like voter confidence that structural measures don't predict.
- MCD-harmonized analysis: infrastructure paper paired with `rurality` v0.2, bringing the framework to sub-county jurisdictions (New England, parts of WI/MI).

CAVEATS

Observational; not causal. Cross-state variation is entangled with all state-level differences (policy, funding, reporting), which county-level data can't fully separate. 2024 EAVS; sub-county-jurisdiction states excluded.

Sources. IRR: Kim & Waldorf (2023), Zenodo 10.5281/zenodo.7675745. Spatial SEs: Conley (1999). UOCAVA: MOVE Act (2009). Data: EAVS (U.S. EAC); SPAE (MIT Election Lab); RUCC/RUCA (USDA ERS); NCHS (CDC).

Rurality.app
A FIELD GUIDE TO RURAL AMERICA

A companion tool for this research: look up the *rurality profile* of any U.S. county, city, or ZIP code. Built on USDA ERS, U.S. Census, and FCC data. An R package and Stata module ship alongside.

RURALITY.APP