Assessing the Transportation Impact of Establishing Regional Transportation Planning Organizations:
Evidence from the Mid-Atlantic

Mustahsin Aziz, Yessenia Cruz Caleno & V. Dimitra Pyrialakou

West Virginia University

November 14, 2025

NARSC 2025

Table of Contents

Motivation

- Multimodal passenger transportation planning is well developed for large metropolitan areas, and there is a growing empirical literature on Metropolitan Planning Organizations (MPO).
- In contrast, small urban and rural communities:
  - Face aging populations, higher poverty, and long travel distances.
  - Rely heavily on autos and low-volume rural roads.
  - Often lack formal regional planning capacity or multimodal expertise.
- States have begun to formalize Regional Transportation Planning Organizations (RTPOs) to fill this gap, but:
  - Evidence on whether RTPOs *causally* improve safety and mobility in rural areas is limited.
  - Most existing work is descriptive or case-study based rather than based on quasi-experimental designs.

Introduction and Research Question

- Federal transportation policy and empirical evaluation have focused primarily on MPOs and metropolitan regions.
- For many rural and small urban areas:
  - RTPO adoption is optional and uneven across states.
  - Regional planning functions are fragmented or handled centrally by state DOTs.
- This creates a natural policy variation:
  - Some states adopt RTPO frameworks (e.g., Pennsylvania and Virginia), while neighboring states do not.
  - Adoption occurs at a specific time, allowing before/after comparisons.
- **Research question:**
  - Using county-level panel data and a Difference-in-Differences design, what is the causal effect of RTPO adoption on:
    - Average commute time?
    - Traffic accidents and fatalities?
    - Non-motorist-involved crashes?

Previous Literature

- MPOs have had a significant impact across many sectors including the environment (Mueller et al., 2016; Sevtuk & Amindarbari, 2020)
- The mix of voting members (city vs non-city) in MPO can significantly alter what it funds and plans. (Nelson et al., 2024)
- MPOs can significantly improve transits. (Sciara, 2019)
- Coordination is an important factor for success for MPOs (Goetz, 2002).
- Gap in litrature on the role of RTPOs on transportation outcomes.

Data

- Transport outcome data was collected from Crash Data from the Fatality Analysis Reporting System (FARS) of National Highway Traffic Safety Administration by US DOT
- Commute time was collected from ACS 5-year estimates
- County level data, from year 2010 - 2022.
- Treatment Assignment: PA and VA undertaking RTPO assignments in 2016.

Propensity Score Matchin

- We conducted a PS match with near neighbour formulation using income, employment, demographic characteristics, educational attainment, work in county, percentage of rural roads and distance to nearest MSA.

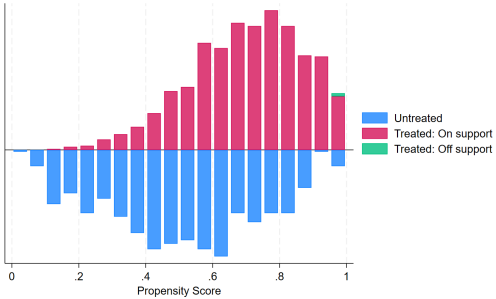
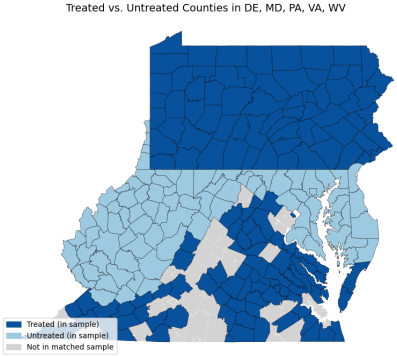


Figure: PS Match Support

Treatment Assignment

- Counties in PA and VA are considered in treatment.
- Counties DE, MD, WV are controls.
- Weights considered in DID after PS Match.



Model

Difference in Difference Specification with event$_t ime = 2016$

$$Y_{it}^k = \alpha + \beta^k(\text{RTPO}_i \times \text{Post}_t) + \gamma_i + \lambda_t + \mathbf{X}_{it}'\theta^k + \varepsilon_{it}^k$$

- Y_{it}^k: outcome $k \in \{\text{Travel time}, \text{Accidents}, \text{Fatalities}\}$ for county i in year t.
- RTPO_i: indicator for counties in states that adopt RTPOs (PA, VA).
- Post_t: indicator for post-adoption years.
- γ_i, λ_t: county and year fixed effects; $\mathbf{X}_{it}$: controls.
- β^k: ATET of RTPOs on outcome k (estimated with clustered SEs at county level).

Primary Results

	Travel Time	Accidents	Fatalities	Accidents with No Motorists
ATET	-0.4526** (0.00828)	-1.083** (0.0223)	-1.090*** (0.0127)	-0.3736** (0. 0199)
N	1700	1700	1700	1700

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

RTPO adoption significantly reduces average commute time, traffic accidents, and fatalities across treated counties relative to matched controls.

Further Work

- Reassign treatment and control groups to test robustness — for example, limit treatment to counties with active RTPO participation or vary adoption years.
- Experiment with alternative matching techniques such as **kernel**, **radius**, and **Mahalanobis distance** matching to assess sensitivity to matching design.
- Test **matching without replacement** and apply **caliper thresholds** to reduce poor matches and mitigate over-reliance on highly weighted controls.
- Incorporate **inverse probability weighting (IPW)** and **doubly robust estimators** to evaluate treatment effects under different weighting schemes.
- Conduct **placebo and falsification tests** using pre-adoption years to confirm that observed effects are not driven by pre-existing trends.

Conclusion

- The analysis provides the first causal evidence on the impact of Regional Transportation Planning Organizations (RTPOs) in rural and small-urban contexts.
- Difference-in-differences estimates show that RTPO adoption significantly reduces average commute times, traffic accidents, and fatalities relative to comparable counties.
- These results suggest that institutionalizing regional planning capacity improves safety and mobility outcomes even in low-density areas.
- Effects are modest in magnitude but consistent across outcomes, supporting the role of coordination and data-driven planning in rural transportation policy.

Thank you!

Mustahsin Aziz
PhD Candidate
Regional Research Institute
mustahsinul.aziz@mail.wvu.edu

Connect with me