Evaluating the Impact of Uncompensated Care Reimbursement on Texas' Rural Hospital Closures

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Objective

To estimate the impact of the Texas Medicaid 1115 uncompensated care waiver on rural hospital closures.

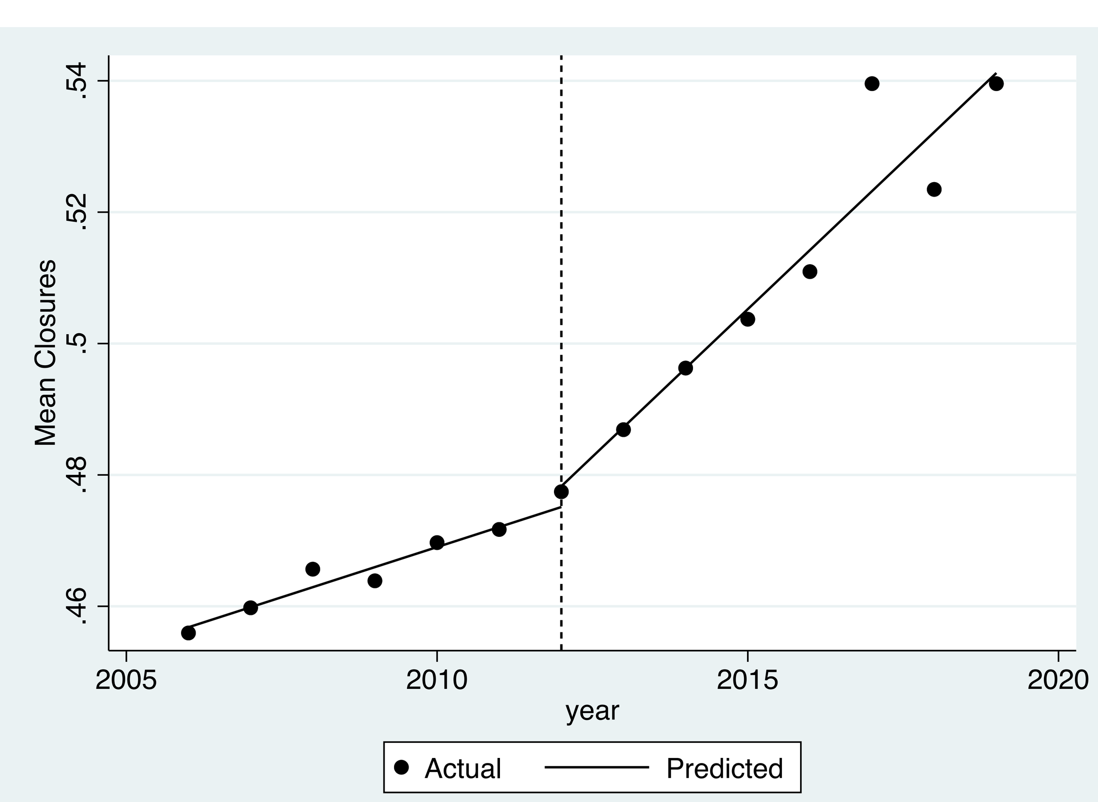
Introduction

Texas has one of the highest rates of rural hospital closures in the nation.[1] While rural hospitals are critical to regional economic and physical health, their viability is threatened by demographic trends and high uninsurance rates.[2]

One policy intervention designed to support hospitals is the Texas Healthcare Transformation and Quality Improvement Program 1115 waiver.[3] Implemented in 2012, this has created an annual fund of $2-4 billion to fund uncompensated (UC) care for eligible hospitals.[3] On average, this pool, which hospitals may apply for, covers 20-40% of total UC costs.[3] In 2017, the definition for UC care shifted from Medicaid shortfall and charity care to charity care only.[3]

While this waiver removes financial barriers to provide care, its contribution to Texas' increased rural hospital closure rate has not yet been studied.

Figure: Trends in Rural Hospital Closures Before and After Implementation (2012)



Methods

I employ two quasi-experimental approaches: a difference-in-difference estimator preceded by an event study, and an interrupted time series (ITS) regression.

Difference-in-Difference Estimation

Main Model:

$$(1)\quad Y_{ijt} = \beta_0 + \beta_1 M_{it} + \rho X'_{jt} + \delta_t + \kappa_t + \epsilon_{ijt}$$

Where Y_{ijt} is a dummy variable for closure of hospital i in county j at year t. M_{it} is a dummy variable for waiver participation. δ_t and κ_t represent county and year fixed effects, respectively. X'_{jt} accounts for county-level yearly unemployment rate, uninsurance rate, and median income.

Parallel Trends:

$$(2)\quad Y_{ijt} = \beta_0 + \sum_{r=-5}^{6} \beta_r M_{it} + \rho X'_{jt} + \delta_t + \kappa_t + \epsilon_{ijt}$$

Where β_r represents the effect of waiver participation r years later (or previously, for $r < 0$). These coefficients test for endogeneity in treatment assignment among treatment (participating) and control (non-participating) hospitals. .

Interrupted Time Series Regression

$$(3)\quad Y_t = \beta_0 + \beta_1 T_t + \beta_2 D_t + \beta_3 T_t D_t + \epsilon_t$$

Where Y_t represents state-level mean closures at year t, T_t is the year, and D_t is a dummy variable for treatment. β_3, the coefficient of interest, represents the difference between pre-treatment and post-treatment slopes. β_1 and β_2 represent pre-trends and level changes, respectively.

For robustness, this regression is estimated for Critical Access Hospitals (4), which participate but are largely immune to Medicare and Medicaid reimbursement reductions.

Results

SE clustered at county level for (1) and (2).

Table: Effect of Waiver Participation using Difference-in-Difference Regression (1)

	(1): Coefficient of Interest (β_1)
Estimation	.0542938
95% CI	[0.04095, 0.06764]
P-value	<0.001

Figure: Event Study Coefficients (2) at 95% CI

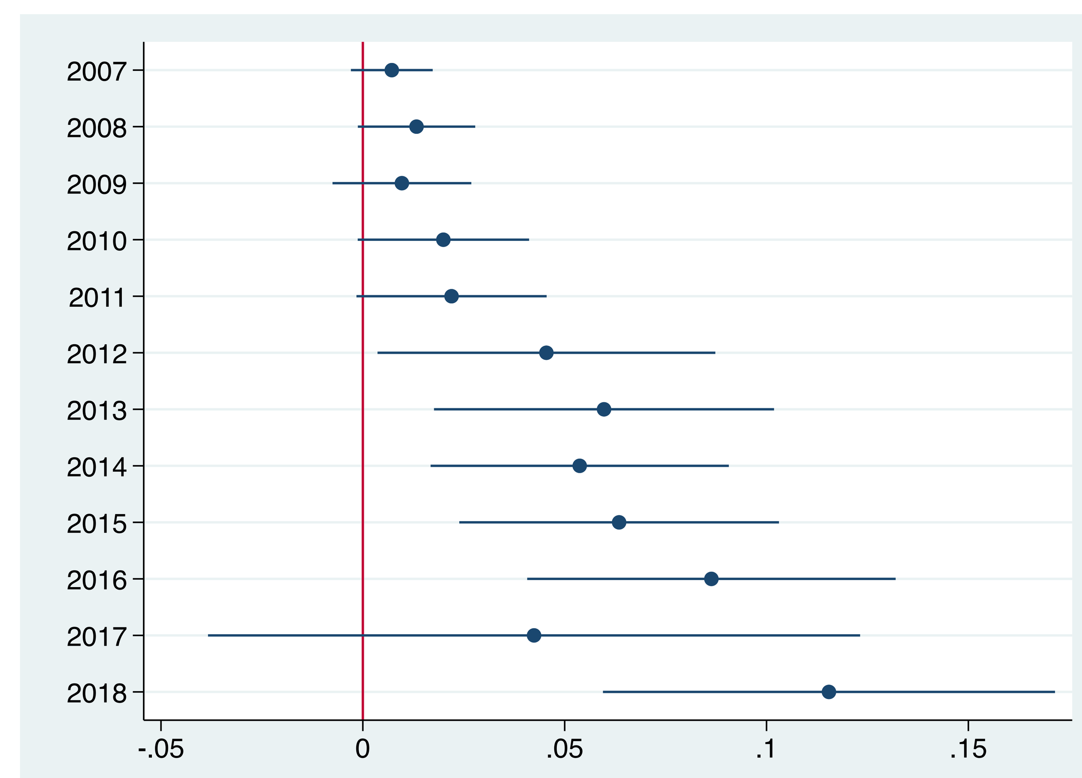


Table: Effect of Waiver Participation in non-Critical Access Hospitals (3) and Critical Access Hospitals (4) using ITS Regression

	(3)	**(4)**
Slope change	.0059351 $p < 0.001$	.0051537 $p = 0.013$
Pre-trend	.0030516 $p < 0.001$	.0087208 $p < 0.001$
Level change	.0031594 $p = 0.044$	-.0174487 $p = 0.041$

Newey-West SE for first-order autocorrelation used in (3) and (4). Both are robust to pseudo-start dates.

Conclusion

The increase in closure probability following the waiver was 5.42938 percentage points higher in participating rural hospitals than in non-participating rural hospitals. Parallel trends is validated in this model at $p = 0.05$. ITS specification also indicates a positive change in the rate of rural hospital closures. This finding is robust to considering only Critical Access Hospitals.

Taken together, these results suggest that funding uncompensated care did not reduce the rate of rural hospital closures in Texas and may have played an counterintuitive role. This effect cannot be explained only by other changes in Medicare or Medicaid policy or by broader population trends. Future research should consider hospital financial measures such as total expenditures and uncompensated costs to identify a mechanism.

References

Data Sources: CMS, BLS, USDA, US Census Bureau, Texas HHS

1. "173 Rural Hospital Closures: January 2005 – Present (131 since 2010)." *Sheps Center*, The University of North Carolina at Chapel Hill, 13 Aug. 2020.
2. Germack, Hayley Drew, et al. "When Rural Hospitals Close, The Physician Workforce Goes." *Health Affairs*, 38(12): 2086–2094, 2019.
3. Health Management Associates. *Evaluation of Uncompensated Care and Medicaid Payments in Texas Hospitals and the Role of Texas' Uncompensated Care Pool*. Texas Health and Human Services Commission, 26 Aug. 2016.

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