Early-life mortality and local administrative differences: Evidence from district borders in India

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Four-sentence summary

I investigate the net effects of district-level variation in public facility use. I use DHS data to study rural areas of eight high-mortality states in India. I find that living on the side of a district border with more public facility birth increases delivery in public facilities, lowers neonatal mortality risk, and increases skin-to-skin contact. I assess the validity of the identifying assumptions for this research design.

Background

For residents of rural areas in eight high-risk states in India, public health facility births have markedly lower neonatal mortality (29 per thousand) than private health facility births (44 per thousand). This holds even though families that use public facilities are poorer. However, it's not clear what's causing that difference: selection, good treatment in public, bad treatment in private.

District outcomes vary

Indian districts are the administrative unit below the state level. They have some autonomy in public health administration and they are responsible for implementing many national and state programs. There is substantial heterogeneity in public facility use by district.

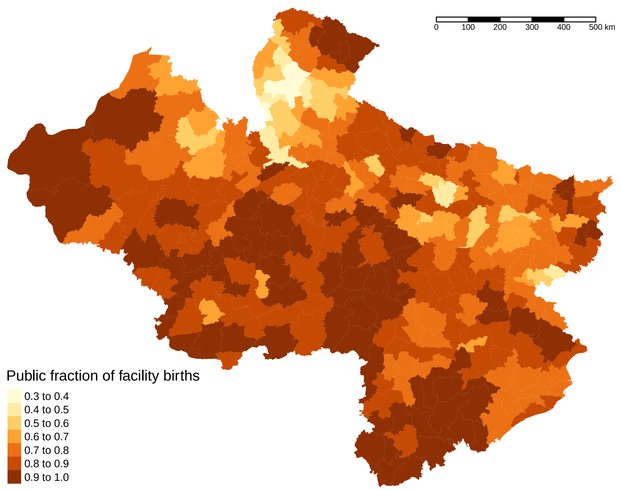
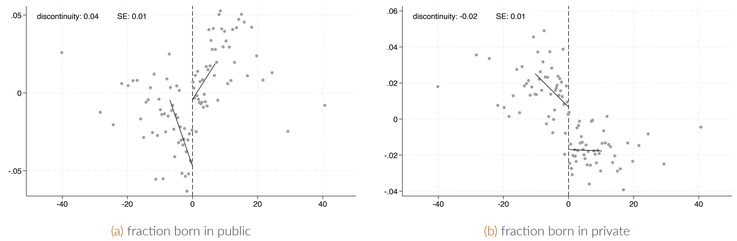


Figure 1. Identifying variation: Public fraction of facility birth by district, DHS 2019–2021

Empirical strategy: border regression discontinuity

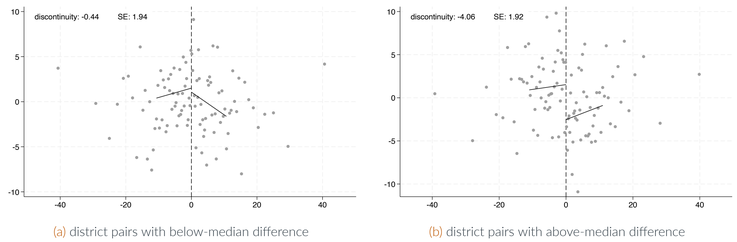
- **Data.** DHS surveys of India, conducted 2014–2015 and 2019–2021, with village geographic data, household characteristics, and mothers' and children's health behavior and outcomes
- **Unit of analysis.** A birth to a rural family in the five years preceding the survey in Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, or Uttar Pradesh
- **Outcomes.** Public facility birth, neonatal mortality, ambulance use, and skin-to-skin contact; demeaned by district pair
- **"Treatment."** Exposure to district environment with higher average rate of public facility birth rather than neighboring district with lower
- **Running variable.** Distance to nearest district border

Results



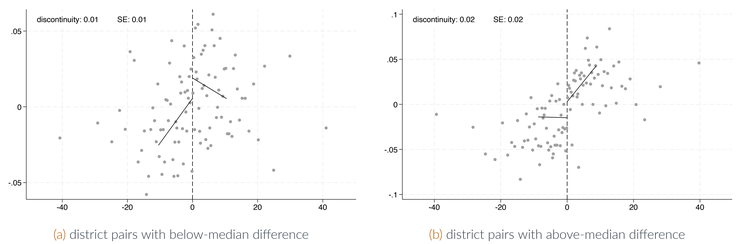
(a) fraction born in public (b) fraction born in private

Figure 2. First-stage? Living just in the district with greater public facility use increases **public facility use**



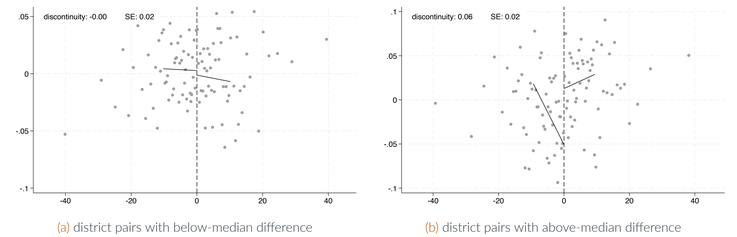
(a) district pairs with below-median difference (b) district pairs with above-median difference

Figure 3. Outcome? Living just in the district with greater public facility use decreases **neonatal mortality**



(a) district pairs with below-median difference (b) district pairs with above-median difference

Figure 4. Mechanism? Living just in the district with greater public facility use insignicantly increases **ambulance use**



(a) district pairs with below-median difference (b) district pairs with above-median difference

Figure 5. Mediator? Living just in the district with greater public facility use increases **skin-to-skin contact**

Clarifying the "treatment"

In this research design, I compare villages in neighboring districts. The "treatment" is living in the district that has the higher proportion of institutional births in public facilities. Referring to Figure 1, "treatment" is basically living in the darker district rather than the lighter district.

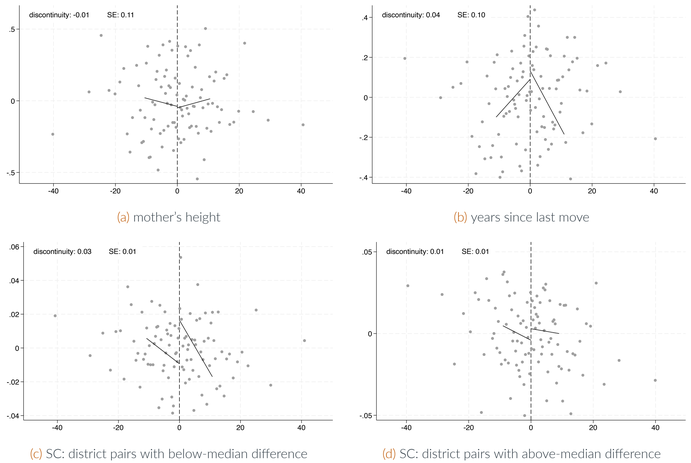
(To avoid endogeneity, I leave out the birth's own village in calculating the district-level proportion of institutional births in public facilities.)

Examining identifying assumptions

Continuity

Definition: The expectations of the potential outcomes at the cutoff are continuous in the running variable.

I can't provide direct evidence of this, but I can present falsifying tests. I found no significant discontinuities in fraction male, birth year, mother's time since last move, wealth quintile, literacy, height, or religion. The only significant discontinuity is in scheduled caste status, presented below.



(a) mother's height (b) years since last move

(c) SC: district pairs with below-median difference (d) SC: district pairs with above-median difference

Figure 6. Continuity tests: Two passes, one small fail

Fuzzy regression discontinuity?

As I suggest in the figure titles, I plan to use a fuzzy regression discontinuity design with these data to estimate a local average treatment intention-to-treat effect of birth in a public facility on neonatal mortality. This will require satisfying more stringent assumptions: *exclusion*, which holds that the potential outcomes and the potential treatments aren't affected by the running variable; and *monotonicity*, which rules out "defiers".

References

[1] Diane Coffey, Nikhil Srivastav, Aditi Priya, Asmita Verma, Nathan Franz, Alok Kumar, and Dean Spears. Excess neonatal mortality among private facility births in rural parts of high-mortality states of india: Demographic analysis of a national survey. Manuscript submitted for publication.

[2] Rashmi Sharma. Organisation Through Neglect: Understanding Field Administration in India. Technical Report 2023-9, Centre For Policy Research, New Delhi, March 2023.

[3] Asmita Verma and John Cleland. Is newborn survival influenced by place of delivery? a comparison of home, public sector and private sector deliveries in india. *Journal of Biosocial Science*, pages 1–15, 2021.